

# Rangelands

Society for Range Management

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The objectives for which the corporation is established are:

- to properly take care of the basic rangeland resources of soil, plants and water;
- to develop an understanding of range ecosystems and of the principles applicable to the management of range resources;
- to assist all who work with range resources to keep abreast of new findings and techniques in the science and art of range management;
- to improve the effectiveness of range management or obtain from range resources the products and values necessary for man's welfare;
- to create a public appreciation of the economic and social benefits to be obtained from the range environment;
- to promote professional development of its members.

Membership in the Society for Range Management is open to anyone engaged in or interested in any aspect of the study, management, or use of rangelands. Please contact the Executive Vice-President for details.

## Rangelands

*Rangelands* serves as a forum for the presentation and discussion of facts, ideas, and philosophies pertaining to the study, management, and use of rangelands and their several resources. Accordingly, all material published herein is signed and reflects the individual views of the authors and is not necessarily an official position of the Society. Manuscripts from any source—nonmembers as well as members—are welcome and will be given every consideration by the editors. *Rangelands* is the nontechnical counterpart of the *Journal of Range Management*; therefore, manuscripts and news items submitted for publication in *Rangelands* should be in nontechnical nature and germane to the broad field of range management. Editorial comment by an individual is also welcome and, subject to acceptance by the editor, will be published as a "Viewpoint."

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# Rangelands

## FEATURE ARTICLES

- Evaluation of the Range Condition Concept**  
by E. Lamar Smith ..... 3
- Two Companies—One Goal**  
by Jim Truax and Jim Jensen ..... 7
- People from the Past: John W. Bohning**  
by Kindra Gordon ..... 12
- Women in SRM**  
by Jan Duck Wiedemann ..... 13
- What Causes Willow Die-off?**  
by Ryan Limb, Clayton B. Marlow and Barry Jacobson ..... 14
- Heart-podded Hoary Cress**  
by Michael L. McInnis, Gary L. Kiemec, Larry L. Larson  
Jay Carr and Dan Sharratt ..... 18
- A "Grass-Roots" Effort for the Future**  
by Kindra Gordon ..... 24
- Re-establishing Perennial Vegetation in Cheatgrass Monocultures**  
by Thomas A. Monaco, Blair L. Waldron, Robert L. Newhall  
and W. Howard Horton ..... 26
- Viewpoint: Eastern Nevada Landscape Coalition Position**  
Barry L. Perryman, Robert E. Wilson, and William I. Morrill ..... 30



U.S. Forest Service is a sponsor  
of the 25<sup>th</sup> Anniversary of *Rangelands*.

## DEPARTMENTS

- |    |                       |    |                         |
|----|-----------------------|----|-------------------------|
| 2  | EVP Comments          | 35 | Resource Roundup        |
| 36 | Requiescat in Pace    | 37 | Interpretive Summaries  |
| 40 | Listening to the Land | 42 | Browsing the Literature |
| 44 | SRM Award Winners     | 57 | Letters to the Editor   |
| 59 | Book Reviews          | 60 | Membership Application  |

## COVERS

**Front Cover:** "Old Mother Hubbard" the latest print by Barbara East. Ranchers take time from their rugged life on the range to appreciate the tranquility that a mother duck and her family bring. There is a limited edition of this print. For more information about Barbara's paintings visit her website at [BarbaraEast.com](http://BarbaraEast.com).

**Back Cover:** Spring flowers. Photo by Charles (Bud) Rumburg.



## EVP's Comments

### Water, Weather, and the Next 25 Years



I hope you all enjoyed our very special February issue. I would like to thank all of the editorial team who helped pull it off.

I would also like to welcome the US Forest Service as a "Sponsor" of our 25<sup>th</sup> Anniversary. We will be featuring some special information from them throughout the rest of the year.

I cannot say enough good things about the recent annual meeting in Casper. With attendance over 1,600 and an excellent lineup of technical educational opportunities, it was an outstanding success. Next year we are headed to Salt Lake City, and I saw many of the Utah section taking notes and talking to Wyoming section members, so I am sure the 2004 Annual Meeting will also be a hit.

It seems that the topic of many discussions right now is the drought. The news is providing daily updates on snow pack percentages. For Colorado, we were looking at about 75% of average, then a nice week of snow bumped that up to about 85%. The Colorado legislature is looking at ways to balance water demands among urban and agriculture. Popping up in newspapers are editorials reflecting opinions that we should shut off the water flow at the state border from the Arkansas, the Rio Grande, the Platte, and the Colorado rivers. While that isn't going to happen, it does certainly make some pause and think about it. I am sure that other states are also looking at water demands and the best way to resolve the many issues.

Conservation and education are going to be the two key words that SRM should embrace. Regarding conservation, I am not just talking about water conservation and shorter showers, but the overall implications of good conservation planning and the effects on rangelands. Investment in our time and resources for education of urban planners, small acreage owners, youth groups and others will pay dividends in understanding and cooperation.

Regardless of weather, it is going to be a good year for rangelands through our individual and our collective efforts. We must continue to think proactive versus reactive. Let's lay the groundwork for the next 25 years right now.





# Evaluation of the Range Condition Concept

If the term “range condition” can be retained, it should refer to site condition, not the use rating, since site condition is closer to the concept of “the state of range health.”

By E. Lamar Smith

*As a tribute to the 25<sup>th</sup> anniversary of Rangelands, we present this article which first appeared in “Rangelands” in April 1979.*

(April 2003) When asked to reflect on the subject of this paper, my first thought was that we have come a long way since 1978-79. The climax approach to range condition assessment and the successional model on which it was based are no longer accepted (at least not openly) as universal by most range ecologists, and the ecological site concept has gained scientific acceptance. Changes in concepts and terminology have been proposed and some of them implemented. Now range professionals speak of “multiple pathways”, “states and transitions”, “resource value ratings”, “seral stages”, “desired plant communities”, “thresholds” of various sorts, and “rangeland health.” But the concept of pristine ecosystems existing in an intricately co-evolved state of balance and perfection that can be easily upset, i.e. degraded, by man-caused “disturbance” persists in most of the natural resource professions and among environmental activists. Publications and management objectives are full of references to “natural” processes and conditions, implying that use and management of resources should aim to restore such conditions or at least not detectably “degrade” them. The concept of setting objectives based on human needs and managing for them in a sustainable way seems to have lost ground to “protection” of nature for nature’s sake. “Rangeland health” (an old term associated with range condition, which I regrettably used to end my paper), as it is being applied, all too often seems to be a reincarnation of the value-laden terminology and “organismic” concept of ecosystems that characterized the climax approach to range condition. Maybe we haven’t come very far after all.

**Editor's Note (Danny Freeman) in 1979:** *This article provides a good discussion about range condition ratings. Hopefully, it will encourage agencies and others to use range condition terminology that means the same thing to everybody.*

The concept of range condition (and trend) is perhaps the most important one in range management. The idea that the present status of rangeland in relation to its potential could be evaluated and used to indicate effectiveness of management and potential for improvement goes back to about the turn of the century. While the concept has been widely accepted, used, and discussed, it is apparent that considerable confusion still exists relative to exactly what is being measured and why. This article examines the reasons for some of this confusion and suggests changes to reduce this confusion.

Classification of range sites is fundamental to the concept of range condition. Obviously, if condition is to be rated relative to potential, the potential must be defined. Range sites (or roughly equivalent terms, such as habitat type or land units) have been characterized somewhat differently by various individuals or agencies. However, the main concept is of a kind of land which has potential to produce a certain kind or amount of vegetation, which has certain other intrinsic characteristics, such as susceptibility to erosion, and which responds to management in a distinctive way. The primary factors distinguishing one site from another are soil, topography, and climate; thus range sites can be recognized irrespective of present use or vegetative cover.

Hacker (1973) pointed out that there are two basic approaches to rating range condition on a site. One he referred to as ecologically based and the other as productivity based. In the first, condition is rated relative to the observed or inferred climax or pristine vegetation for the site. This rating usually involves comparison of present vegetation (and sometimes soil characteristics) with reference areas presumed to exhibit climax or near-climax conditions. “Ecological condition” is not affected by the intended use of the range. The assumption is usually made that climax vegetation will provide adequate soil protection. In the United States, the “climax” approach proposed by Dyksterhuis

Areas shown in these three photos all represent loamy upland range sites at the Santa Rita Experimental Range. All three have similar soils and rainfall.

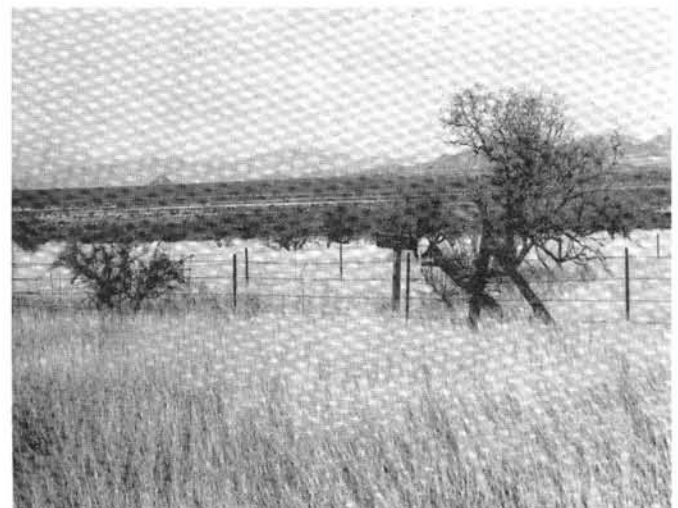
*This study plot has been excluded from grazing since 1916. The vegetation does not represent "original" conditions because brush and cactus have increased. Present range condition rates only fair by SCS standards because, even though the grasses are mostly "climax" species, brush and cactus are mostly considered invaders on the site. Yet, there is little to suggest that condition will improve without man's intervention. Soil protection and site stability are obviously not too good because of the amount of bare soil and sheet erosion. Forage production for livestock is low but habitat for deer, javelina and quail is relatively good.*



*This area has been invaded by mesquite, other shrubs and also Lehmann's lovegrass, an exotic species, which makes up about half of the perennial grass composition. Since both mesquite and Lehmann's lovegrass are considered invaders by the SCS, this site also rates low fair to poor in range condition. However, forage production for livestock is higher than in Photo 1 and there is little or no evidence of erosion.*



*This enclosure was also fenced in about 1916. Invasion of mesquite has been minimal, but Lehmann's lovegrass, which was introduced on the Santa Rita 20 years after the enclosure was fenced, has spread naturally into the area both inside and outside the enclosure. It now composes about 90% of the plant composition outside the enclosure and about 70% inside. Range condition based on "climax" is low fair to poor inside and very poor outside, yet forage production for livestock is much better than on either of the locations above. Soil protection is excellent. Habitat for most game animals is inferior to the other two locations.*





(1949) and presently used by the Soil Conservation Service and others is an example of this approach.

**The productivity-based approach** rates range condition according to present productivity in relation to the potential for a particular use. In this approach, every actual or proposed use of the site has a different condition rating. For example, a site producing near its potential in terms of forage for cattle would be rated excellent for cattle grazing, but might be considered only fair for grazing of sheep or deer. Condition ratings do not imply site stability since condition may vary from poor to excellent on the same site, depending on the use considered. This approach has been generally referred to as the "site-potential" approach in the United States (Humphrey 1949).

In practice these two approaches have often been confused. For example, the Soil Conservation Service has claimed to use the climax approach. But, in fact, for many years their classification of the status of plant species in relation to climax vegetation (the decreaser, increaser, invader concept of Dyksterhuis, 1949) was definitely biased toward livestock use, especially cattle. On most range sites almost all perennial grasses were considered climax species (decreasers or increasers) and almost all unpalatable shrubs were considered invaders. Recently, in response to pressure for other uses and as a result of ecological research, the Soil Conservation Service has come closer to the strictly ecological approach. Although the Forest Service has never adequately recognized site differences and, consequently, has confused site potential with range condition, it too has followed the same general pattern as the Soil Conservation Service. As a result, it is now common for range managers to distinguish between "ecological condition" and condition for specific uses such as cattle grazing, watershed protection, or wildlife habitat. In my opinion this is a step in the right direction.

Strict adherence to the climax approach creates some problems in the concept of range condition. First is the problem of recognition that condition based on climax is not always meaningful in management terms. It is generally recognized that the climax or near-climax condition is not necessarily best for a given use. Thus, a manager's objective may be to manage the range to maintain "good" or "fair" condition rather than "excellent." This may be biologically sound, but it is undesirable from a management standpoint. The utility of condition ratings in pointing out to the manager where management needs to be improved is reduced, since a condition of "fair" may be desirable on one site but indicate a need for improved

management on another. Also, in these days of public scrutiny of resource management, deliberately managing for "fair" condition rather than "excellent" may have serious consequences for range users. The layman may assume that any rating below "excellent" indicates poor stewardship of the land. Psychologically, it would be better to aim for excellence. Perhaps this problem could be at least partially solved by dropping the descriptive terms and using a numerical rating.

**A second problem** is related to the difficulty of defining what is the "climax" for any given site. It has been well documented in the American Southwest that much rangeland which was formerly grassland has been invaded by mesquite, juniper, creosote bush, small pines, and other woody species since about 1900. The causes of this invasion have been laid to climatic change, exclusion of fire, and/or overgrazing. Whatever the reason, the plant communities have changed and there is little evidence that natural succession will bring them back to their pristine state unless the environmental conditions of that pristine state (i.e., burning, climatic patterns) are also restored. Should range condition be measured relative to that pristine grassland or to the new climax dominated by woody plants?

A third problem is that the ecological concept, as used in the United States, does not accommodate exotic species because they are not considered part of the climax vegetation. Therefore, most seeded stands cannot be rated as to range condition since most of them are composed of exotic species. Similarly, the presence of alien species in native plant communities may lower the condition rating even though they are naturalized and contribute materially to forage production or other values.

A fourth difficulty is related to the problem of rating condition as a departure from climax where the climax is forest or woodland rather than grassland or shrubland. Forage production may decline to a very low level as the forest or woodland climax is approached. In a sense this situation is not different from the admission that "excellent" condition ecologically is not necessarily "excellent" from the range forage standpoint. In this case it is so contrary to our usual concept of range condition that the Soil Conservation Service has abandoned the ecologically based rating of range condition of "grazeable woodlands" or forest clearings in favor of a rating of forage quantity and quality, a site potential approach. (This approach is outlined in its 1976 National Range Handbook.) Such areas are not even considered rangeland. It is not clear why the addition of a tree overstory should result in a

complete change in the approach to condition or just where or why the line between rangeland, grazeable woodland or forest should be drawn. The basic purpose of range condition and trend assessment is to evaluate the effects of management on site stability and habitat desirability. Fulfilling this purpose seems as important on grazed forest or woodland as on grassland or shrubland.

**The most basic concept in management** of renewable natural resources is that of sustained yield, which implies that potential site productivity will not be impaired by man's actions. There may be a wide range of possible uses for a site, but degradation of the site will reduce the number and/or value of the uses possible, thus reducing future options for management. Any measurement of range condition, then, must at least establish whether the site is deteriorating or not as a result of past and current management. Site deterioration would be most likely reflected in accelerated soil erosion.

The assumption implicit in ecologically based range condition is that the climax vegetation will provide site stability. But, if it is assumed that we can manage for something less than climax, e.g., "fair" condition, then we are also assuming either that climax vegetation is not a necessary condition for site stability or that a measure of stability can be sacrificed. However, it is not evident whether site deterioration begins with poor condition, fair, good, or even the slightest departure from climax. The degree of departure from climax at which site deterioration becomes significant may vary from one site to another. In other words, on one site soil stability may decline with a slight departure from climax while on another the soil may remain stable even if all of the vegetation is removed. Therefore, a rating of site condition is needed which would be primarily based on soil characteristics and independent of the type, amount, or successional status of the plant species on it. This rating would simply indicate if site condition is satisfactory or unsatisfactory relative to the potential stability for the site. A rating of unsatisfactory would indicate that management must be changed to bring the site back to a relatively stable condition. If site condition is satisfactory and trend is not down, then present management is adequate from a site protection standpoint.

If site condition and trend are satisfactory (i.e., the site is not deteriorating) the decision as to whether the present characteristics of the vegetation are desirable or undesirable depends on the planned use of the site. "Condition" in this case would follow the site-potential approach in that the present utility of vegetation for each use would be judged a high, medium, or low in relation to the best possible condition for that par-

ticular use on that site. The characteristics of the site, including climate, determine the potential for a particular use including the possibility of modification of the site by irrigation, fertilization, introduction of new species, etc. The goal of management would be determined by the capability of the site for various uses and the mix of uses which would give the highest return economically, esthetically, etc. The need for changes in management strategy would be determined by how nearly the present situation approaches the potential for the uses desired, both individually and collectively. For example, if the decision was to maximize livestock forage then the goal would be to achieve high condition, i.e., near the site potential, for that purpose. However, if the management goal is to maximize timber production, then the forage condition expected is low to medium. In this case "low" does not represent an undesirable condition but a rational management decision.

**To summarize, I propose** that the concept of range condition as it is generally used is inadequate and should be modified. Each range site has a number of possible uses and potential values for each use. Management should not permanently reduce the number of possible uses or the potential value of each. A measure of site condition, based primarily on soil characteristics, should be developed to indicate the success of management in maintaining the site and should indicate whether present condition is satisfactory or unsatisfactory. A rating should also be made for each possible use of interest to the manager as to how nearly the present vegetation approximates the most useful type of potential vegetative cover for that particular use. This rating could be expressed simply as a percentage or as a descriptive modifier such as high, medium, or low. If the term "range condition" can be retained without confusion it should refer to site condition, not the use rating, since site condition is closer to the concept of "the state of range health."

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*The author is associate professor, School of Renewable Natural Resources, University of Arizona, Tucson. This article is based on a paper presented by the author at the First International Rangeland Congress, August 1978, in Denver, Colorado.*





## Two Companies—One Goal

Truax and Sharp Brothers are two names in the industry that have a long-standing history and dedication toward improved range and pasture lands.

**Editor's Note:** *Truax Company and Sharp Brothers Seed Company have been two long-standing advertisers in Rangelands magazine. With this 25<sup>th</sup> Anniversary of the publication, we recognize and thank both companies for their support. Following is a brief summary of each company's history and their present and future goals.*

### Truax Company

By Jim Truax

Located in Minneapolis, Minnesota, Truax Company manufactures and markets equipment for drilled or broadcast seeding of most types of seed used in establishing vegetative cover. The company has been in business since 1974.

As a landscaper during the early 1970's, Jim Truax experienced firsthand the frustration of trying to plant native prairie grasses with available equipment. These frustrations led to the design and development of the Truax Drill. Truax equipment is designed from the top down to effectively meter and plant grass seeds at the required shallow depth for successful stand establishment.

While the initial emphasis was planting native species, the addition of the small seed box and the optional cool season/grain box gives Truax seeding equipment the capability to efficiently meter and plant most types and textures of grass, legume, wild flower, and cover crop seed. In addition a Truax Drill will plant small grains and soybeans.

Today the Truax product line includes: the *FLEXII Series Grass Drills*, *FLEXII Series Grain Drills*, and *Utility Drills* for double disc drilled seeding; the *Trillion*, a *Pull-Type Broadcaster*, and the *Seed Slinger* for broadcast seeding. The latest addition to the product line is the *Rangeland Rough Rider* for drilled seeding on rugged non-agricultural lands.

During the first ten years the company manufactured and sold no more than ten or twelve machines each year. This scale of operation kept Jim in the landscape business, which in retrospect was to his advantage. First, it created an income stream to finance the drill business without incurring any debt. And second, it kept him in the field using and testing his own equipment. The result was many improvements to make the drills a better machine for getting the job done.

It took almost fifteen years before Jim reached a sales level of twenty-five drills a year. During these early years Jim started attending meetings and conferences including those of the Society for Range Management, Prairie Conferences, Wildlife Conferences, etc. to promote the Truax drill.

These conferences provided the opportunity to meet a lot of other people with similar interests in native plant establishment and maintenance and to



*The Rough Rider.*





*The Trillion.*



*The FLEXII Drill.*

gain a better understanding of the challenges they faced. It also provided Jim with the opportunity to keep abreast of ongoing research and new developments in working with native prairie species. Association with and support of local, state and national groups including professional societies such as the Society for Range Management, Soil and Water Conservation Society, The Wildlife Society, and other groups continues today.

Over the years Truax equipment established a reputation for doing an outstanding job planting native grasses and more importantly plantings that resulted in quality established stands. Because of this early groundwork, in 1986 when National Farm Bill legislation created the Conservation Reserve Program (CRP) Truax Company was able to increase sales of drills for establishing quality wildlife cover.

Truax Company utilizes a direct market approach between the manufacturer and the customer for both initial sales and service. This approach has been successful in helping keep customer costs down as well as keeping open a direct line of communication between the manufacturer and the end user.

Customers are located in 49 of the 50 US States as well as internationally in Canada, Mexico, the Falkland Islands, Germany, Saudi Arabia, Tunisia, and South Africa. Over the years Truax Company has relied on input from customers, employees, and a cadre of current and former Soil Conservation Service/Natural Resources Conservation Service specialists to make improvements in the product line.

The need for equipment to plant new or improve existing stands of vegetative cover is great as one looks at the potential for improving the quality of grasslands across America and throughout the world. The implementation of efforts to make these improvements depends on many factors including this nation and the world's economic and political situations.

In America, federal, state, and local programs will play a major role in what we accomplish. Truax Company plans to continue to maintain a presence in providing the tools to help implement those programs directed at establishing and improving vegetative cover for all uses.

Truax Company pledges to continue providing grass seeding equipment to meet customer's needs. *"Leading the way...for precision seed placement."* For the latest information on Truax equipment visit the Truax website at [www.truaxcomp.com](http://www.truaxcomp.com).

## **Sharp Bros. Seed Co.**

**By Mark Jensen**

You are all familiar with Uncle Sam, the mythical white bearded fellow who represents the heart and soul of our nation. If you would, place yourself in Uncle Sam's shoes as he may have felt touring the American Great Plains in the 1950's. Looking back the old man was proud of his country's many accomplishments: her industrial ingenuity and pro-



ductivity, her scientific and medical advances, her many victories in the struggle to advance human freedom at home and abroad.

But the old fellow was never content to rest on his laurels. Now that World War II and the Korean War were behind him, the old man felt it necessary to revisit the site of the Great Dust Bowl in the 1930's, a natural disaster and manmade disaster that combined into a disaster of huge proportions. He was only mildly pleased with the progress since those days.

Though many conservation steps had been successfully implemented, he was dismayed to see that huge acreages of farmland continued to suffer the ravages of erosion. The species makeup of rangelands had shifted drastically away from its original populations, now favoring less productive species. Many productive species were gone, not a remnant to be found in county after county. Windbreaks, waterways and terraces were badly needed on many cultivated acres. It was clear that some farmland had never been suited for cultivation and its marginal productivity was being further reduced by erosion. Revegetation with native species was the only solution where conditions were so severe. Once Uncle Sam identified a problem he then went to work on a solution. Conservation of natural resources was about to enter a new, more proactive era.

Now place yourself in the shoes of two brothers from the Sharp family of Healy, Kansas in the 1950's. Gerald had served in the Navy and Gail in the Army. They had both returned to Healy to put down permanent roots. An idea developed between the two that they might start a native grass seed company. The need for such a company was evident but the potential pitfalls were numerous and were mostly unknown. At that time expertise in native grass seed production was rare or nonexistent. Nonetheless the brothers decided to do it and Sharp Bros. Seed Co. was born in 1958.

Initially their efforts were focused on locating and harvesting seed from native stands of grass in locations scattered from Texas to Montana. Native grass species produce good seed crops only under specific weather patterns. Grass in any given location may produce a good seed crop only one year out of a dozen. Identifying locations with seed potential and managing harvests far from home were skills the brothers quickly mastered. Expertise in these endeavors continues to be passed on within the company to the present time.

During the early years of Sharp Bros. Seed Co. two needs converged to cause the brothers to expand on their methods of producing grass seed. First, conservationists from that period saw the value of specific varieties or cultivars of native species. Varieties of native grasses were the result of selection work done by the USDA, with many important varieties being released in the 1950's. Since these varieties had been tested for adaptation to many different environments, conservationists could prescribe their use in locales where adaptation and performance were known.

Second, the brothers knew the sporadic nature of grass seed production in the wild. Procuring a seed supply from the wild was dependent on the fickle whims of Mother Nature. Consequently the brothers decided to plant and manage single species, variety specific, grass seed production fields.

Their first grass seed field was planted to Indiangrass one mile north of their Healy, KS headquarters in 1965. They were lucky to be located at Healy, in the center of the central plains. Many varieties of native grass, both warm and cool season, could be propagated for seed production in the Healy area. Developing cultural practices for native species was a result of hard work, intuition and lots of trial and error.

Pioneering these practices resulted in many sweet successes and more than a few bitter disappointments. A bountiful harvest of seed from one field could be followed the next day with a total loss caused by something as insignificant as a few hours of strong wind which blew all of the seed from the seed heads.

As Gail Sharp put it, "At that time, we converted some of our farmland to grass seed production. I am sure some people thought we were crazy for taking good corn, wheat and milo ground and growing grass seed on it. And there were moments that I would have agreed with them."

The company managed to grow and prosper through the 1960's with added production acres and a new seed conditioning plant allowing them to package a superior product. Sharp Brothers Seed Company came to be known as the native grass seed company with quality seed and quality advice.

The professional quality of the brothers' advice was due in no small part to their active involvement with the Society for Range Management and other

individuals and organizations devoted to conservation. Gerald served on the Lady Bird Johnson Beautification Committee and had traveled to South America to assist and advise Columbian conservationists in their problems with native seed harvest and drying.

Tragedy struck in July of 1971, when Gerald Sharp and Roy Cramer were killed in a plane crash while inspecting a grass field in Wyoming. At the time Gerald was serving as President of the Kansas Seed Dealers and as Chairman of the American Seed Trade Association Conservation Committee. Gail was forced to deal with the devastating loss of a beloved brother while struggling to maintain a company that had become a major component in the economy of Healy, Kansas.

As Gail Sharp explained, "It is in a time like that one finds out how helpless we really are. I really didn't know if Sharp Bros. Seed Co. could survive. I asked my Lord for his help. He provided me with strength, understanding and the insight to listen to our friends and associates. Many of them gave help when needed. One person especially took my hand and led me through the rocky spots of the business world and I will always be grateful to him. Thank you, Bob Appleman."

In February 1972 Art Armbrust came to work for Sharp Bros. Seed Co. Gail says of Art, "He was knowledgeable and skilled in agronomy with thirteen years of experience in the seed business. He took to grass seed like a duck to water and with his outgoing personality Sharp Bros. Seed Co. was on the move again."

The company expanded further in the 70's, 80's and 90's adding to its acreage of seed production and expanding its seed conditioning operation with more capacity and state of the art machines which produced seed with new levels of quality, unattainable in the past.

Sharp Brothers serves as a major supplier of seed for reclamation of retired strip mines and retired farm ground as well as for forest fire, roadside and disturbed site reclamation. Sharp Brothers also supplies ranchers with native and introduced species for high management grazing lands, both dryland and irrigated.

Buffalograss seed produced by Sharp Brothers has



*Gerald Sharp in June of 1967. The field is Cheyenne Indiangrass one mile north of Healy. It is the first native seed production field planted by Sharp Brothers in 1965. Photo taken by Howard Cheney of Grainfield, Kansas.*



*Gerald Sharp in August of 1967 in the same field as above. Photo taken by Howard Cheney of Grainfield, Kansas. Mr. Cheney was district conservationist of Gove County, Kansas at this time.*

grown in importance beyond conservation applications and is now a widely planted turfgrass across the United States and beyond. Sharp Brothers has sold buffalograss seed to China where it is used in the Beijing area to vegetate the median strips along



highways and on the grounds of the historic Summer Palace.

In order to service the heavy demand for seed during the early CRP years, Sharp Brothers operated a warehouse in Amarillo, Texas from 1976 to 1993, with Clyde Sherrieb as manager.

In 1982 Sharp Brothers established a warehouse and sales branch in Greeley, Colorado to service the Rocky Mountains and northern high plains. This allowed the company to focus on the unique characteristics of that region, beyond that of the central plains where it had originated. In addition to the conservation applications of its seed, the Greeley branch grew to become a trusted supplier of adapted perennial forages and turf grasses for the region.

Sharp Brothers Seed Company of Missouri, headquartered in Clinton, was founded in 1985 to produce and market seed for the more humid environments of the eastern United States. Single species plantings of certified native species have been established at Clinton to assure reliable supplies of quality seed. The Missouri branch has led the company in pioneering new markets with parks and recreation departments, wildlife agencies, roadside development and landscape applications.

Membership in the Society for Range Management has been and continues to be an essential part of the life of Sharp Bros. Seed Co. Gail Sharp currently serves on the SRM Endowment Board of Governors. Art Armbrust has served as Kansas-Oklahoma chapter president, National Membership Committee chairman and Advisory Council chairman. Art received the SRM Trail Boss Award, appropriate recognition for a fellow with a "take charge" demeanor. Wayne Vassar, manager of Sharp Bros. Seed Co. of Missouri since its founding is past president of the Southern Section. Maurice Miller, production manager at Healy, presently serves on the board of the Kansas chapter. Staff members regularly attend SRM conferences and conventions in order to further their professional training. Sharp Bros. Seed Co. was honored to receive the Society's Outstanding Achievement Award and the Trail Boss Award.

Now, please place yourself in the shoes of Dan Sharp at Healy, Kansas, David Sharp at Greeley, Colorado, and Wayne Vassar in Clinton, Missouri. Theirs is the challenge to continue the success of the past while adapting to the future. They continue the

struggle to match production with need. It is difficult to predict the demand created by government programs and impossible to predict demand created by natural disasters such as forest fires. Demand must be satisfied by a 'factory' which must be geared up years before the first seed is placed in a bag.

Rangeland in many areas has declined in productivity since the droughts of the 30's and 50's. Ranchers look to Sharp Brothers for interseeding advice to improve those working rangelands but often they must be advised of the tremendous difficulties of such an endeavor. Sharp Brothers continues to search for solutions to this problem.

One of the big questions regarding the future direction of the conservation movement regards using ecotypes of local origin for reclamation and revegetation. This would shift demand away from the time-honored practice of using varietal seed for these applications. An efficient infrastructure has developed around the production of varietal native species seed. Because of this, large quantities of seed with known characteristics are available for an economical price.

Making seed of local ecotypes available on a similar scale and economy is in uncharted territory – it has never been done and no one knows if it can be done. Sharp Brothers will continue to work with its many associates in SRM and other conservation organizations to exchange experiences and ideas.

"Dirt on their boots" field conservationists, conservation administrators and the conservation seed industry must keep each other informed of that which is possible, practical and economical, on their side of the conservation effort. So long as the conversation about conservation flows both directions, Uncle Sam's natural resources will continue to improve in the future. SRM serves as the premiere forum for these conversations and is the key-stone to conservation's future.



## People From The Past

### John W. Bohning

**Editor's Note:** *As we commemorate the 25<sup>th</sup> Anniversary of Rangelands magazine, we pay tribute to SRM members who have helped shape the profession of rangeland management.*

**By Kindra Gordon**

John "Jack" W. Bohning has been a member of the Society for Range Management since the early 1950's, and says he joined the organization because of the influence of SRM members with whom he worked.



Bohning's career history focused on range management positions in the U.S. Forest Service, as well as serving as Air

Attack Boss on large fires. He began his college education at Washington State University, left it to go into the service, then went to the University of Idaho in 1946 and graduated in 1948.

Bohning retired as range and wildlife staff on the Prescott National Forest. Currently, he works as a volunteer with the Conservation Education Committee of the Natural Resources Conservation Service (NRCS).

Over the past 50 years, Bohning has been involved in both section and Society committees, Boards of Directors and served as President of the Arizona Section as well as SRM President in 1982.

He recognizes former SRM Executive Vice President Pete Jackson with being a strong influence in setting the management direction for SRM issues and affairs. Bohning recalls a fireside discussion he and Pete had one night at an International-Mountain meeting in Alberta. From that discussion, Pete submitted an application for the position with SRM and was favorably received by the SRM Board. "Pete's wide variety of experience stood the SRM in good stead," Bohning says.

Bohning credits the *Rangelands* magazine with being a publication that promoted an exchange of information among technicians and challenges in the field, as well as an opportunity to exchange ideas and philosophies among international members. He says, "*Rangelands* provided a publishing outlet for budding writers. It also provides the glue to hold members together, and I hope it continues to be the meeting place for all interested parties."

Bohning counts intervention of non-qualified interests seeking legislative solutions to technical problems as one of the greatest natural resource challenges during the past 25 years.

But, a positive change during the history of SRM has been the acceptance of the Society as a knowledgeable entity, says Bohning. Agencies and organizations are seeking SRM input rather than the SRM acting in response to issues, and that's the role SRM should serve, he says.

His advice to future generations studying rangeland management is this: "Look for broad horizons in employment. Many rangeland employment opportunities now exist in the private sector. Don't wrap yourself up in a single agency or cause."

*Jack Bohning now lives in Prescott, Arizona with his wife Arline. The couple was married in 1945 and have been blessed with five daughters who live from coast to coast. Bohning says, "We enjoy visiting them and our five grandsons, one granddaughter, one great grandson and one great granddaughter."*



# Women in SRM

Over the years, many women have had a leadership role in developing SRM policies and programs.

By Jan Duck Wiedemann

In 1987, Marliyn J. Samuel was elected as the society's first female director. Succeeding directors have been Barbara Allen-Diaz, Linda H. Hardesty, Carolyn Hull Seig, Meg B. Smith and Angela S. Williams.

Meg Smith, a rancher from Glen, Montana, credits the SRM for playing a positive role in her life—from the High School Youth Forum and College Plant Identification Team days, to the present. As a rancher and range manager, Meg has relied on the organization and its publication to provide her with information and research.

Angela Williams, with the Natural Resources Conservation Service in Oklahoma, has said, "the Society has been my nucleus for professional development and alliance, while I have always believed in the mission and abilities of this Society." Angela says she believes the diversity of the general membership within SRM is a great asset.

A past SRM president, John C. Buckhouse who is a professor in the Department of Rangeland Resources at Oregon State University, commented on how women contributed to the Society: "Women have a long and valued history in SRM. Many sections have or have had female presidents. In the current cohort, 25 percent of those asked to assume committee roles are women. The stance of the board of directors is that SRM is a society of persons interested in the well being of rangeland and in the professional development of people who are interested in these rangelands."

In 1998, the Society had 4,400 members. Of the 443 female members who supplied demographic information, 85 percent lived in the 18 western states, plus a few in Brazil, Argentina, Mexico, Canada, Iceland, Denmark, England and Australia.

The majority of the female members work for federal agencies with more than 100 reporting they were range conservationists. There were 21 women

ranchers, 16 ecologists, two botanists and one nurse practitioner. Occupations ranged from a research professor, range technicians, biologist, manager of an association, a reclamation specialist, a geothermal coordinator to a 4-H agent. Members represent a diverse group of women working toward the goal and objective of taking care of our rangeland resources.

Today, women continue to gain momentum in non-traditional career fields including range management. Their leadership is reflected in the posts they hold—from international and national government cabinet positions to leadership positions in their states and local communities. The SRM leadership also represents this movement, with Angela Williams being elected second vice-president in the fall of 2002. She will take the reins as SRM's first woman president in 2005.

**About the author:** Jan (Duck) Wiedemann has been a member of the Society for Range Management since 1977, has served as Administrative Assistant in the Denver headquarters office, and was Executive Secretary (Acting) from 1982–1983. She has been Archivist for the Texas Section since 1988, has served on the SRM History, Archives and Library Committee and has served on the Rangelands Editorial Board. Wiedemann lives in College Station, Texas. She has submitted book reviews for SRM publications since 1992 and most recently reviewed Thad Box's book "Me N' Alvin".



## What causes willow die-off?

A Montana study looks at the relationship between stem cankers and browsing.

By Ryan Limb, Clayton B. Marlow and Barry Jacobson

In riparian areas, willow (*Salix* spp.) has been identified as a key species for stream health, bank stability, vegetative filter zones and the winter survival of deer, elk, moose, beaver, hares, and ptarmigan. Consequently, the sustainability of individual willows and willow communities is fundamental to both the functioning of riparian ecosystems and the maintenance of certain wildlife populations.

While we may recognize the linkage between willow survival and that of dependant wildlife species, we know little about the factors that govern reproduction, establishment, and long-term presence of willows in riparian ecosystems.

Like many other woody plant species, willows are susceptible to diseases including cankers caused by fungi that enter the plant through wounds. Bark wounds can occur from browsing, hail, strong winds, frost or a host of other agents. Once infected, the plant develops a canker that begins to girdle the stem at the site of infection (Fig. 1).

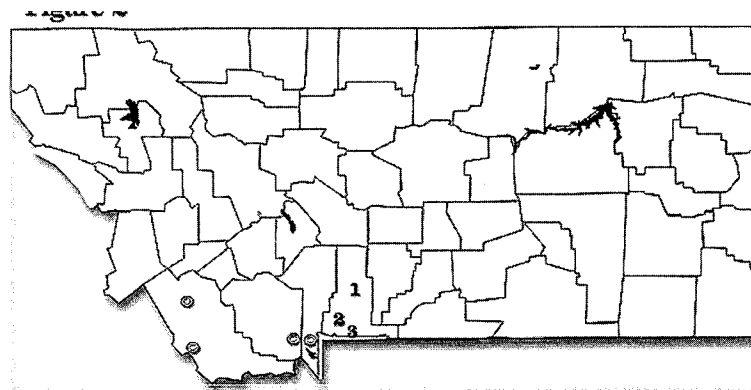
Information on aspen ecology from the US Forest Service indicates that while minor canker infections kill the tissue surrounding the wound, the remainder of the stem's transport tissue (xylem and phloem) will remain alive and functioning. However, if the infection grows or the plant is repeatedly infected, the canker will girdle the stem resulting in death of that stem. This event is commonly called ringing. The heavily infected stem can no longer transport nutrients past the canker to

leaves or buds, and the stem soon dies and falls to the ground. The loss of numerous stems will stunt the growth of the plant and if the losses are sufficiently large, the plant may eventually die. Because quaking aspen (*Populus tremuloides*) is in the same family as willows, we could use this information to predict that stem injuries may lead to canker infections in willows. Severe infections could lead to the loss of numerous willows in a riparian area.

Due to the heightened awareness of the crucial role willows play in riparian ecosystems, it is important for federal, state, and private land managers to know the cause of willow die-off. Even though there are reports of willow die-offs due to declining water tables in eastern California, overuse by wildlife in Wyoming and Colorado and heavy livestock grazing throughout the West, there are very



Fig. 1. Several sandbar willow stems infected with canker. Boxed area indicates stem already dead from canker ringing.



**Fig. 2.** Willow collection sites in the upper Yellowstone Valley, Park County, Montana. 1 = Yellowstone River island, 2 = Tom Miner Creek, 3 = Eagle Creek and 0 = observation sites.

few documented cases of willow losses from disease outbreaks.

Because the ecological literature on willow diseases is limited, we initiated a descriptive study to: a) determine the level of pathogenic fungi infestation of willows in the upper Yellowstone Valley of southwestern Montana and b) describe the relationship between fungal infestation and browsing levels. The anticipated outcome of this study would be a list of canker causing pathogenic fungi on willows, and whether or not a relationship exists between browsing and fungi infestation.

### A Study To Determine Canker Infection

Because of the potential for canker infestations following browsing three riparian areas with high wildlife activity were selected as collection sites (Fig. 2). At each of the three sites individuals of Booth (*Salix boothi* Dorn), Sandbar (*Salix exigua* Nutt), Geyer (*Salix geyeriana* Anderss) and Yellow (*Salix lutea* Nutt) were randomly selected within a 1.25ac area.

Once the identity of the willow was known, browse level was described for each of the selected plants following procedures described in the Forest Service and BLM Interagency Technical Reference Guide. Table 1 displays the categories used and the

estimated level of use assigned to each category. A total of 81 stems with cankers were collected from all three locations (Table 2).

**Table 2.** Location of willow collection sites in southwestern Montana, number of cankered stems collected, willow species encountered and browse levels for plants from which collections were made.

Collection Site	Samples	Species	Number in Each Browse Class
Eagle Creek	31	Sandbar	19 - class 3
		Geyer	12 - class 3
Yellowstone River Island	25	Sandbar	15 - class 3
		Booth	10 - class 3
Tom Miner Creek	25	Geyer	19 - class 3
		Booth	3 - class 2
		Yellow	3 - class 1

To isolate fungi associated with cankers, clippings were taken from cankered stems no more than three years old (Fig. 3). This was done to avoid past infections that might have healed. Stems were harvested so that a healthy section was included with the canker to provide similar genetic material for sprouting at a later date. Healthy portions of the stems were separated from dead and cankered material, placed in a plastic pail with 4 inches of dechlorinated water and set in a greenhouse with a twelve hour photoperiod and temperature ranging from 72–75° F. The stems were allowed to sprout roots and produce leaves.

Canker sections were placed in a storage container at 100% humidity and 70° F for 21 days. Isolations of fungi were made by removing a 0.25 square inch section of infected tissue from the margin of the canker, and partially embedding it in acidified agar. Fungi were allowed to grow on the agar for one week. New cultures were made from these plates to establish pure cultures for fungi identification.

**Table 1.** Browse classes used to assign level of willow use by wildlife.

Class	General Description	Percent Use
0	Little to no browsing	<25%
1	Lightly browsed	25–50
2	Moderately browsed	50–75%
3	Heavily browsed	>75%



**Fig. 2.** Appearance of healthy (non-cankered) stems, placed in greenhouse for rooting. Stems were from infected willows to avoid canker resistance due to genetic variation.

After one week the pure cultures were examined and fungi identified to the genus level through microscopic analysis of fruiting body and spore type. Once the cultures began to sporulate, some of the spores were removed with a metal probe and used to re-infect the original, healthy portion of the willow growing in the greenhouse. All of healthy stems had developed roots and leaves by the time of the reinfection.

A small sample of each fungal isolation was placed under the willow's bark. Each bark incision was wrapped in Parafilm<sup>®</sup> and allowed to incubate for 14 days at room temperature. Incisions were also made in several more healthy willow stems which were then incubated without spore inoculation for use as controls.

If a canker formed on the infected willow stem, isolation of the fungal material was performed as previously described. To ensure that the same fungi species were from the original source isolates were examined according to standard plant pathology diagnostic procedures.

## What Was Learned?

Twenty-one different types of fungi were isolated from the infected willow stems but, only seven (Table 3) were found to cause cankers following inoculation of the live stems (none of the controls with incisions developed cankers). This indicates

that *Arthrobotrys*, *Tubercularia*, *Aspergillus*, *Cylindrocladium*, *Cytospora*, *Dothichiza*, and *Coniothyrium* can be infectious to willows.

In the Eagle Creek drainage near the northern border of Yellowstone National Park, sandbar, Booth and Geyer willow all showed signs of heavy browsing (Table 2). Corresponding with this heavy browsing, nearly all browsed branches and stems showed canker infection symptoms. The same relationship was noted on the island site in the main stem of the Yellowstone River. Both sandbar and Booth willows had been browsed heavily (Table 2) and all the branches had canker infections.

The situation was different at the Tom Miner Creek site where willows showed signs of heavy (Geyer), moderate (Booth) and light (yellow) browsing (Table 2). Lightly browsed willows only had occasional stem infections while the majority of stems on the heavier utilized plants were cankered. Statistical analysis of the Tom Miner Creek data indicated that browse class and the level of stem cankering were closely related.

The results from this survey indicate that several canker-causing fungi are present on willow samples in the upper Yellowstone Valley. The close relationship between the level of browsing and the occurrence of cankers at one collection site suggests that heavily browsed willows may be more susceptible to fungal invasion and therefore more prone to rapid and complete die offs than lightly used shrubs. However, carefully controlled studies are needed to determine the degree to which browsing increases willow susceptibility to fungal infection and die-off.

**Table 3.** Pathogenic fungi found on browsed willows in the Yellowstone valley of southwestern Montana. Values represent proportion of total fungal population isolated from individual willow stems.

Fungi	Percent of Collections
Arthrobotrys	36
Tubercularia	15
Aspergillus	7
Cylindrocladium	4
Cytospora	3
Dothichiza	3
Coniothyrium	1



Our observations indicate that once a stem or branch was infected with a canker causing fungi, the branch began to die from the point of infection back toward the main stem of the shrub. Most often, 1-2 inches was killed, but 4.5- 45 inches of die back was noted on several heavily browsed plants in the Eagle creek area.

Review of historic grazing records indicated that the three locations we selected had not been grazed by livestock prior to stem collection. Tom Miner Creek has a rotational livestock grazing system, but cattle had been absent for two years. The US Forest Service records show that livestock were removed from Eagle Creek in the 1930's and the island within the main branch of the Yellowstone River has not had livestock grazing.

Wildlife, primarily deer, elk and moose were responsible for the browsing at all three locations. This suggests that wildlife induced disease outbreaks could have limited willow populations along streams and rivers prior to European settlement. Among riparian processes stream channel stability would have been most affected by how extensive these die-offs were and how long it took willows to reoccupy former sites.

A general survey of riparian areas outside the Yellowstone river drainage during the summer of 2001 revealed the presence of cankering under heavy browsing conditions. In the Big Hole

*The sustainability of willow communities is fundamental to both the functioning of riparian ecosystems and the maintenance of certain wildlife populations.*

drainage near Wisdom, Montana, anecdotal evidence suggests that moose were responsible for massive diebacks on similar willow species. As much as 80 inches was noted to have died on one branch (Geyer willow) where heavy brows-

ing had occurred. Similar diebacks are common, although not necessarily as dramatic, in willows occupying the Madison, Gallatin and Beaverhead drainages. All of these drainages are heavily used by wildlife during the winter months.

Looking at the evidence collected thus far, it is obvious that the relationship between browsing and fungal canker infestation in willows should be studied in greater detail. Especially important is how the pathogens are being transported from plant to plant, which wildlife species, if any, are important in fungi transmission, whether infection periods are seasonal and how browsing levels might affect the stem die-off/recruitment rates of commonly occurring willow species.

*Authors are respectively, a private consultant working out of Bozeman, Montana, an associate professor, Animal and Range Sciences and a professor, Plant Sciences and Plant Pathology, Montana State University, Bozeman, MT. This work was supported by the Montana State University Undergraduate Research Program and the Montana Agricultural Experiment Station. For more information contact; Clayton Marlow at [cmarlow@montana.edu](mailto:cmarlow@montana.edu)*

# Heart-podded Hoary Cress

An in-depth review of the characteristics and control methods for this troublesome weed.

By Michael L. McInnis, Gary L. Kiemnec, Larry L. Larson, Jay Carr and Dan Sharratt

Heart-podded hoary cress or whitetop (*Cardaria draba* (L.) Desv.) is a native plant of Eurasia that was accidentally introduced into North America in the early 1800's. The first botanical collection in the United States was made at Long Island, New York, in 1862. By the early 1900's heart-podded hoary cress had spread across the United States and was recognized as a noxious weed of alfalfa, small grains, peas, and other crops.

Heart-podded hoary cress is now found throughout the United States except in southern portions of California and the south central States. Movement from cultivated fields to adjacent rangelands is common and increasing. In a report to the Oregon Department of Agriculture, H.D. Radtke estimated heart-podded hoary cress occupies nearly 1.7 million acres in Oregon alone, and is responsible for annual production losses of \$2.5 million in that state.

Heart-podded hoary cress is classified as a noxious weed in 24 States and four Canadian Provinces. It can form dense monocultures that displace native plants and reduce biodiversity, wildlife habitat and forage production (Fig. 1), and contains chemicals called glucosinolates that may be toxic to nearby vegetation and livestock.

Scientists and land managers in Oregon have studied hoary cress for the past several years. This report summarizes what

we have learned about the ecology and management of this troublesome weed.

## Plant Characteristics

Heart-podded hoary cress is a deep-rooted perennial forb of the mustard family (*Brassicaceae*) that grows 18-22 inches tall and reproduces by seeds and by shoots produced from buds along a horizontal creeping root system (Fig. 2).

Leaves are alternate, simple, toothed, and lance-shaped. Lower leaves are stalked, and upper leaves are sessile and clasp the stem. The white flowers are typical of mustards and have four petals arranged in a cross. Flowers are clustered at the ends of the stalks in a nearly flat-topped arrangement. The small brownish-red seeds are about 1/16

inch long and resemble alfalfa seeds. They are produced in heart-shaped capsules containing two seeds separated by a partition.

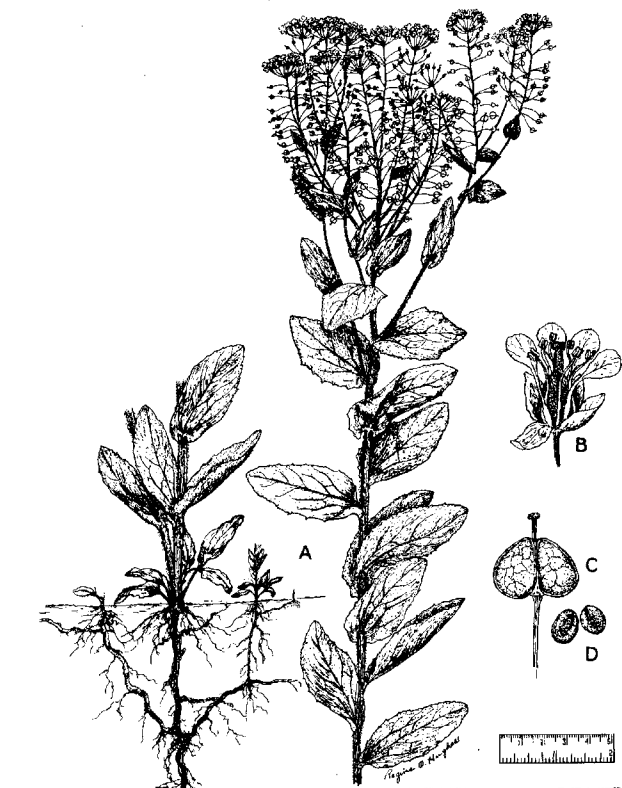
Once mature, seeds are released singly through ruptures in the capsule walls; as individual capsules; or as capsule clusters that break away from the parent plant.

Two other species of hoary cress occur in the United States and Canada: lens-podded hoary cress (*C. chalepensis* (L.) Hand.-Mazz.); and globe-podded hoary cress (*C. pubescens* (K.A. Meyer) Jarm.). The primary identifying charac-



**Figure 1.** Heart-podded hoary cress has a creeping root system and forms dense monocultures that can displace native plants and reduce biodiversity, wildlife habitat and forage production. A single plant growing in absence of competition can spread over an area 12 feet in diameter and produce more than 400 shoots the first year of establishment.





**Figure 2.** Heart-podded hoary cress. A, habitat; B, flower; C, seed capsule; D, seeds (USDA 1971).

teristics used to separate species are differences in seeds and seed capsules.

Lens-podded and globe-podded hoary cress are suited to moist sites, and are not abundant in semi-arid environments. Heart-podded hoary cress is the most common species of *Cardaria* on North American rangelands. Plants that may be mistaken for hoary cress include field pennycress (*Thalapsi arvensis* L.) and western yarrow (*Achillea millefolium* L.).

### Seed Production and Germination

G.W. Selleck reported in 1965 that a single plant can produce 1,200 to 4,800 seeds, of which 84 percent are viable. In our studies, we measured nearly 17,000 viable seeds/ft<sup>2</sup> in a single year on a site near Keating, Oregon. When moistened, seeds exude mucilage that helps them stick to the soil surface to aid germination and establishment.

Seeds can be distributed to new sites in many ways including sowing contaminated crop seed; in hay contaminated with seedheads; seedheads at-

tached to the undercarriages of vehicles and equipment; in surface runoff and running water; and through digestive tracts of animals.

Amaya Lowry, graduate student in the Department of Rangeland Resources at Oregon State University, found germination of hoary cress seeds may be diminished by ruminant digestion, but remains high enough for managers to be concerned with spread of viable seeds in manure.

Seeds mature in late July or early August, but are not likely to germinate until the following spring (February–April). We conducted laboratory trials in environmental chambers and found seeds require approximately 4 days of near-optimum moisture and temperature conditions to germinate.

In another laboratory study we found lower germination rates and poor root development when available moisture was below field capacity. We also found germination and root growth was not diminished in saline environments.

Field germination of seeds varies with landscape position, and is favored on sites where soil moisture can be maintained near field capacity in the spring. Our work showed germination was greatest on lower slopes, less on ridgetops and north slopes, and least on south slopes. We also found highest germination among seeds placed on the soil surface compared to buried seeds.

### Establishment From Seeds And Creeping Roots

Heart-podded hoary cress seedlings have a better chance of becoming established on disturbed sites such as ditch banks, roadsides, haystack yards and gopher mounds than on sites fully occupied by desirable vegetation.

Emergence of seedlings is greater in annual grass communities such as cheatgrass than in sagebrush/perennial grass communities. A study conducted by G. Scurfield in 1962 showed that plants established from seeds on open ground reach full size about 3 weeks after spring germination and then begin to develop lateral roots.

He also found that a single plant growing in the absence of competition can spread over an area of 12 feet in diameter and produce 455 shoots the first year of establishment. We observed an average of 45 shoots/ft<sup>2</sup> on a site fully occupied by heart-podded hoary cress in eastern Oregon.

Shoots can be produced every year from adventitious buds on the creeping root system but density of shoots varies by year. Production of shoots is highest during years with cool-dry weather in April and/or warm-moist conditions in the first half of May. While warm-moist weather during April stimulates shoot production, subsequent spring frosts can reduce total shoot density that year.

Pocket gophers and other small mammals cache root fragments in tunnels and may spread adventitious buds to new locations where they can grow into new plants.

### Allelopathy

Allelopathy is an ecological process in which growth or reproduction of an organism is inhibited by chemicals produced by a competing organism. Seeds and leaf tissues of heart-podded hoary cress contain several of the same glucosinolates that are found in rape and known to be allelopathic.

We examined the influence of heart-podded hoary cress root extract (ground roots mixed with distilled water) on germination of alfalfa, winter wheat, bluebunch wheatgrass, and crested wheatgrass. Seeds were placed in Petri dishes and germination was compared using root extract versus only distilled water. Seeds were germinated in an environmental chamber for eight days.

Hoary cress root extract slowed the rate of germination (% seeds germinated/day) of all species. Total germination (following eight days) in the extract treatment was less than with water for all species except wheat. Initial root growth of all species was reduced by the extract compared to distilled water. These results suggest that hoary cress roots may contain chemicals that inhibit germination and initial seedling growth in natural environments.

### Nutritional Value

Heart-podded hoary cress is generally considered poor forage for livestock. However, sheep will consume the early growth stages and cattle will ingest seedheads in late summer after more palatable forage has dried.

We conducted chemical analysis of heart-podded hoary cress from eight sites in Baker County, Oregon during each of five growth stages: rosette,

### Which herbicides work on heart-podded hoary cress?

Knutson and Ransom (1998) examined several herbicides for control of heart-podded hoary cress in a non-cultivated setting. Herbicides were applied via a CO<sub>2</sub>-pressurized backpack sprayer calibrated to deliver 20 gallons/acre at 30 psi. Herbicides were mixed with water and Sylgard 309®, a silicone surfactant. Treatments were applied mid-May, 1997 when hoary cress plants were in the late flower stage and 12- to 24-in tall.

Herbicides that provided over 90% control the year following application included Escort® (metsulfuron) applied at 0.0188 lb ai/acre (95% control); and Escort® (0.0188 lb ai/acre) combined with 2,4-D LV Ester (1.0 lb ai/acre) (93% control). 2,4-D LV Ester applied at 2 lb ai/acre resulted in 88% control of hoary cress and was judged to be the most cost-effective treatment.

The authors noted that none of the herbicides provided 100% control and follow-up treatment is required for all chemicals.

bolting, early bloom, full bloom, and hard seed. Collections of whole plants from rosette to hard seed, respectively, indicated the following trends: crude protein (29 to 8%), organic matter digestibility (77 to 49%), and digestible energy (3 to 2 Mcal/kg). Levels of 11 micro- and macro-elements were typical of other rangeland plants, but sulfur varied from 0.7 to 2.7%, and was therefore higher than the reported maximum tolerable level for most grazing animals (0.4%).

In 1931, C.E. Flemming stated hoary cress "contains an irritant principle and may cause trouble under conditions of forage shortage." It is now known that 11 plant families, including mustard, contain glucosinolates that can form toxic chemical compounds in the digestive tracts of animals. More than 60 glucosinolates are present in the mustard family and all are sulfur-containing compounds. This probably accounts for the high levels of sulfur we found in our samples.

Toxic chemicals produced when glucosinolates are digested may inhibit iodine uptake by the thyroid, and can cause thyroid enlargement (goiter) and growth depression, especially in young animals. The effect is most pronounced when dietary iodine is low but can be overcome by increasing iodine levels of the diet. Other by-products of glu-





**Figure 3.** *A single plant can produce 1,200 to 4,800 seeds. Proactive management to reduce seed dispersal is one of the most effective and least expensive measures to help prevent infestations of new areas. Hoary cress should be cleared from along irrigation ditches and streams to prevent movement of seeds in running water.*

cosinolate digestion are irritating compounds that can cause blistering of tissues, severe gastro-enteritis, salivation and diarrhea. Under some conditions, nitriles are produced that can result in liver and kidney lesions and poor growth.

## Management Requires Integrated Approach

Effective management of heart-podded hoary cress requires an integrated approach that consists of (1) *containment and prevention* to assure new sites are not invaded; and (2) *control* to reduce or eliminate density of plants in areas already infested.

### *Containment and Prevention:*

This strategy attempts to prevent the spread of hoary cress from infested areas onto adjacent sites. Containment should be considered a temporary measure until long-term control can be initiated. Containment can be achieved by reducing movement of seeds onto new sites and by treating the boundary of the invasion with herbicides to prevent shoots from lateral roots forming an advancing front.

Initial encroachment into new areas is frequently by seed dispersal. Consequently, proactive management to reduce seed dispersal is one of the most effective and least expensive measures to help prevent infestations of new areas.

Hay from fields infested with hoary cress should not be transported to areas free of the weed. Undercarriages of vehicles and equipment should be checked for seedheads and cleaned if necessary. Hoary cress should be cleared from along waterways such as stream banks and irrigation canals to prevent movement of seeds in running water (Fig. 3). Animals grazing infested areas after seed production should be dry-lotted 3–5 days before being moved to non-infested areas to prevent seeds becoming established in manure.

Invasion of weeds into new areas may be reduced by managing rangelands for high ecological condition. Plant communities in which all niches are fully occupied by vigorous perennial plants may be more resistant to weed invasions than areas on which community resources such as soil nutrients, water, space and light are underutilized and therefore available to invading plants. Management strategies such as proper grazing consisting of moderate forage utilization and seasonal rotation of livestock help assure perennial plants maintain vigor and competitive ability.

### *Control:*

Before the development of modern herbicides, Oregon State University Range Extension Specialist E. R. Jackman controlled heart-podded hoary cress experimentally using repeated deep cultivation (“15–20 workings the first year, about a dozen the second and less during the third year”).

Canadian researchers G. A. Mulligan and J. N. Findlay reported in 1974 that three consecutive years of cultivation were required to effectively control hoary cress. The reason heart-podded hoary cress is difficult to control by cultivation was reported by R. F. Miller and his colleagues in 1994. They found that its massive root system (76% of total plant biomass) provides a large pool of stored carbohydrates for regrowth, and numerous below-ground buds that can develop into new shoots.

Insects have not been developed as biological control of hoary cress for two reasons. First, while it is listed among the noxious weeds of many states, it is of lower priority than other widely distributed and economically important weeds such as leafy spurge and knapweeds.

Second, hoary cress is a member of the mustard family that contains numerous important agronomic



**Figure 4.** *Application of translocated herbicides is most effective during flowering when the greatest flow of carbohydrates is to the roots and rhizomes.*

plants such as canola, turnip, radish and mustard condiments. Identifying insects that feed specifically on hoary cress and not closely related mustards is difficult.

Conventional control consists of applying one of several different translocated herbicides. R. F. Miller and colleagues reported in 1994 that chemical control of heart-podded hoary cress is most effective during the flower stage when herbicides are translocated with carbon into roots and rhizomes (Fig. 4).

Herbicides applied prior to flowering may not be as effective because the flow of carbon is mainly to above-ground tissues. Herbicides applied prior to flowering may damage shoots, but will not enter the root system in high enough concentrations to kill the plant. Herbicides applied after flowering will not be effective because low soil moisture causes leaves to senesce, thus reducing photosynthesis and translocation within the plant.

Effective chemical control is often variable because the growth stage of individual stems may not be uniform at any given calendar date. When some stems reach the flowering stage and are susceptible to herbicides, others are still in the rosette stage and resist herbicides.

We found that regrowth of mowed heart-podded hoary cress plants is more uniform than non-mowed

plants. Thus, an effective control strategy may include mowing followed by herbicide application to the regrowth when it flowers. This strategy may also result in greater penetration of herbicide through the canopy because regrowth of mowed plants is shorter than unmowed plants.

The date of mowing also influences subsequent reproductive effort. Plants mowed during flowering produced fewer viable seeds than plants mowed during bolting. However, mowing alone will not provide effective long-term control.

### **Eight Steps For Success**

Heart-podded hoary cress is here to stay. But instead of allowing it to rob our wildlands of biodiversity, forage production and wildlife habitat, we can take steps to help prevent it from spreading and reduce it where it occurs.

Our studies have identified weak links that can be exploited by control measures. Land managers and others who frequent our nation's rangelands must be vigilant in recognizing and controlling weeds such as hoary cress. These eight steps should be taken:

- (1) learn to identify hoary cress and look for it whenever you are in the field; (2) take measures to prevent dispersing seeds to non-infested areas;

- (3) treat infestations when they are small and easy to control;
- (4) apply control techniques known to be effective;
- (5) apply translocated herbicides to heart-podded hoary cress when it is flowering;
- (6) always read and follow herbicide labels;
- (7) monitor treated infestations and follow-up with additional treatment if necessary; and
- (8) strive to manage rangelands for an abundance of vigorous and diverse vegetation.

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## A “grass-roots” effort for the future

The Grazing Lands Conservation Initiative (GLCI) aims to assist land managers in maintaining and improving the productivity and health of America's privately owned grazing land.

By Kindra Gordon

For North Dakota livestock producers seeking advice on rotational grazing strategies, pasture weed control methods, or any other question relating to grazing management, help is just a phone call away.

It's part of a Grazing Management Network the state has set up that allows producers to call on a dozen experienced ranchers and land managers for insight and ideas about grassland management.

Organized by the North Dakota Private Grazing Lands Coalition, the network is just one example of a growing nationwide effort geared toward improving grazing management. Today, nearly 30 states have coalitions similar to the North Dakota group, and each is devoted to providing private landowners with information, guidance and technical assistance on range, pasture and grasslands.

These grass root efforts were born out of a national initiative established over a decade ago known as the Grazing Lands Conservation Initiative (GLCI). The goal of GLCI is to be a resource for private landowners to turn to for advice on how to better manage grazing lands, according to Tim Munns, a Utah cattleman who serves on the national GLCI steering committee.

To that end, GLCI activities across the nation include workshops and ranch tours, newsletters, demonstration sites and trained range specialists all aimed at helping land managers implement sound grazing practices.

“We need a cooperative effort to keep grazing lands healthy,” says Munns, who runs a 400 head commercial herd in northern Utah and currently serves as the president of his state cattlemen's association.

“We don't want a government mandate, but private landowners often need and appreciate technical advice in properly managing grazing lands,” he adds. It was that very mission that prompted the formation of GLCI back in 1991.

### The Need For GLCI

Up until the mid-80's, the Natural Resources Conservation Service (NRCS) traditionally had provided voluntary, technical assistance on private grazing lands. But, the 1985 and 1990 Farm Bills, redirected the major focus of NRCS to conservation planning and compliance on highly erodible cropland. As a result, personnel trained in conservation planning on grazing land dwindled and only about 2% of the NRCS budget was devoted to providing technical assistance to private grazing landowners.

With grazing land comprising the largest single land use of all privately-owned land in the U.S. (and constituting nearly one-half of the non-federal land in the country), many ranchers began to express concern regarding the future of private grazing lands. Texas rancher John “Chip” Merrill was among them.

“These lands are the breeding and growing ground for the country's cattle and sheep; they constitute major watersheds, wildlife habitat, and are a source of recreation and open space amenities,” Merrill says. Because of that, he and other GLCI supporters advocated that private landowners needed access to

### Grazing Conference Will Offer New Ideas

Grazing management will take center stage December 7-10, 2003 in Nashville, Tennessee when the national GLCI (Grazing Land Conservation Initiative) steering committee sponsors their second national conference on grazing lands.

The conference is designed to provide grazing land managers the opportunity to share ideas, learn about cutting edge technologies for grazing practices and increase public awareness of the economic benefits and environmental opportunities of grazing management.

For more information contact conference manager John Peterson at 703-455-6886 or [jwpeterson@erols.com](mailto:jwpeterson@erols.com)

information and technical assistance to ensure the long-term viability of grazing lands.

That's where GLCI and its state affiliates stepped in. In 1991, nine member organizations including the American Farm Bureau Federation, American Forage and Grassland Council, American Sheep Industry, Dairy Industry, National Association of Conservation Districts, National Cattlemen's Beef Association, National Farmers Union, Society for Range Management and the Soil and Water Conservation Society came together to form GLCI on a national level.

Today, representatives from each of the nine member organizations serve on the national GLCI steering committee, and all of them are livestock producers like Merrill and Munns. Their primary aim is to enhance privately owned grazing lands by making voluntary technical assistance – primarily through NRCS personnel – available to the people who manage these lands.

In addition to support from NRCS, the efforts of this national coalition are also carried out through the work of individuals and ag organizations at the local, state, regional and national levels

"The fact that nine organizations have come together for the benefit of one cause – providing voluntary, technical assistance on grazing lands – really dictates the importance of the GLCI effort. GLCI has become one of the strongest forces in support of conservation legislation, and I credit that to the efforts of all nine member organizations," Merrill says.

## The Road Ahead

While GLCI has established its purpose over the last eleven years and experienced some success, Merrill says there is still a long road ahead. In short, he says, "Funding for technical assistance on grazing land is still inadequate."

He outlines GLCI's goals as three-fold:

- 1) To garner funding to restore NRCS technical assistance,
- 2) To secure increased research funding for soil, water, plant and wildlife sciences, and
- 3) To advocate funding for conservation outreach efforts involving Extension agencies and universities.

Merrill says the GLCI steering committee has worked to get these efforts funded through stand-

alone legislation or as part of the Farm Bill. They've been successful in that Conservation of Private Grazing Land legislation was lobbied for and passed as part of the 1996 Farm Bill with the intent of providing up to \$60 million for acceleration of NRCS technical assistance efforts. But the legislation was never funded.

In the 2002 Farm Bill, the Conservation of Private Grazing Land (CPGL) program was again authorized and published in the Federal Register on Nov. 12, 2002. If funded, the CPGL program would allow NRCS conservationists to be better able to assist individuals in understanding the basic ecological principals associated with managing their land and implementing conservation management plans.

"This rule builds our capacity to provide technical assistance to those who own and operate private grazing land," said NRCS Chief Bruce Knight. "This is a voluntary program that address natural resource concerns on private grazing land while enhancing the economic and social stability of grazing land enterprises and the rural communities that depend on them," he adds.

For more on GLCI and state grassland coalitions, visit [www.glci.org](http://www.glci.org)

**Note:** *North Dakota producer Keith Bartholomay and longtime Idaho rancher Bud Purdy currently represent SRM on the National GLCI Steering Committee.*

# Re-establishing Perennial Vegetation in Cheatgrass Monocultures

Planting prostrate kochia in 'greenstrips' may be a viable option to decrease cheatgrass dominance.

By Thomas A. Monaco\*, Blair L. Waldron, Robert L. Newhall, and W. Howard Horton

Humans have had a significant impact on shrublands of the western United States. The introduction of large numbers of livestock into native plant communities that had evolved without grazing pressure has greatly altered vegetation composition. Overgrazing resulted in the loss of perennial grasses and facilitated the widespread invasion by annual species such as cheatgrass (*Bromus tectorum*).

With a herbaceous understory dominated by the short-lived, highly flammable cheatgrass, shrublands became prone to frequent wildfires. Cheatgrass persists under this fire regime because it germinates, grows, flowers, and sets seed before environmental conditions become conducive to wildfires. However, frequent wildfires greatly hinder natural regeneration of long-lived shrubs and complicate efforts to repair the structure and function of western shrublands.

Although this scenario of shrubland conversion to annual grasses has been the focus of scientific research efforts for many decades, few land-management options exist that are capable of re-establishing perennial vegetation in fire-prone regions of the Great Basin and Intermountain West.

Establishment of perennial vegetation in cheatgrass-dominated landscapes is difficult because the rapid growth rate of cheatgrass, especially under cool temperature, makes it extremely competitive for limited soil water and nutrients compared to slower growing perennial species. Even if management efforts successfully revegetate small areas, persistent seedbanks of cheatgrass and a high probability of wildfire undermine the persistence of perennial species. Consequently, to break cheatgrass dominance, wildfire frequency must first be reduced before persistent, perennial vegetation will successfully establish and begin the process of stabilizing landscapes.

Planting fuel-breaks or 'greenstrips' of less flammable perennial vegetation (e.g., Monsen 1994) in strategic locations may provide a feasible option to reduce wildfire frequency (Pellant 1994). Greenstrips are an attractive option because a relatively small area is managed to protect a much larger area. Greenstrips will be most successful if the perennial vegetation can rapidly establish in cheatgrass-dominated areas, tolerate occasional wildfires, and be capable of reducing fine-fuel loads so that additional perennial vegetation can be incorporated back into the landscape.

## Species common to salt desert shrublands.

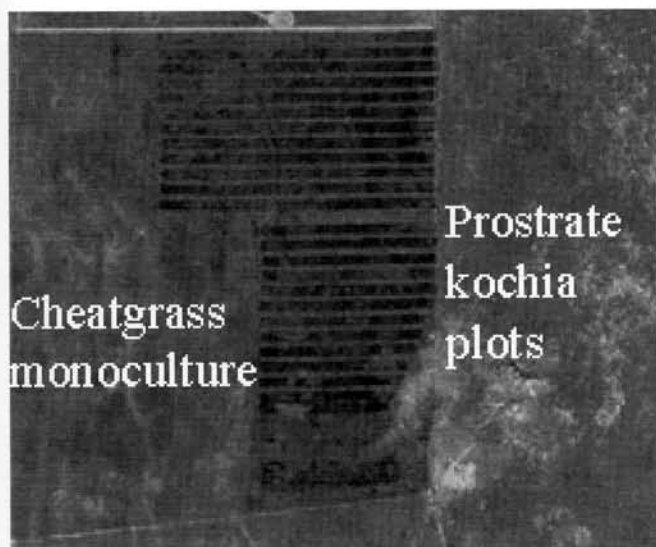
Common Name	Scientific name
shadscale	<i>Atriplex confertifolia</i>
greasewood	<i>Sarcobatus vermiculatus</i>
winterfat	<i>Krascheninnikovia lanata</i>
four-wing saltbush	<i>Atriplex canescens</i>
bottlebrush squirreltail	<i>Elymus elymoides</i>

## Case Study: Skull Valley, Utah

In the 1950s, vegetation in the basins of Skull Valley was dominated by shadscale, greasewood, winterfat, four-wing saltbush, and bottlebrush squirreltail. However, by the mid-1970s, repeated wildfires (natural and human caused) and cheatgrass invasion initiated the elimination of many perennial species in Skull Valley. Recent statistics indicate that over 90% of the individual wildfires in Skull Valley burn greater than 5,000 acres, which leaves little opportunity for perennial vegetation to establish or persist.

Consequently, Skull Valley is an ideal area to evaluate the possibility of establishing persistent, perennial vegetation in narrow greenstrips that may lead to reduced cheatgrass dominance.





**Figure 1.** Aerial photograph of Whiterocks Road research area showing prostrate kochia plots established in cheatgrass monoculture in Skull Valley, Utah.

In 1991, greenstrips were established in cheatgrass monocultures at the White Rocks Road Research Area in Skull Valley using the perennial shrub prostrate kochia (*Chenopodiaceae*) (Page et al. 1994). Prostrate kochia is a half-shrub (i.e., suffrutescent) native to arid and semiarid regions of central Eurasia and is well adapted to soils and climate of sagebrush and salt desert plant communities of the western U.S. (Stevens et al. 1985). The variety 'Immigrant' was released in the U.S. in 1984 and has been subsequently used to stabilize over 150,000 acres of arid rangelands in the western U.S.

Prostrate kochia was seeded in 50 x 1,320-foot or 50 x 800-foot linear plots using 4 methods (Tye no-till drill, broadcast, harrow-broadcast, and broadcast-harrow), at 3 seeding rates (1, 3, and 6 lbs pure live seed per acre), and in 3 seasons (fall, winter, and spring). Each plot was separated by at least a 25-foot area where cheatgrass remained as a monoculture.

Percent cover of prostrate kochia and cheatgrass were evaluated in 1993 and 2001 in all 36 combinations of seeding method, rate, and season, by placing standard Daubenmire frames (50 x 20 cm) at 20 locations along four linear transects (20 m) that ran perpendicular to plots. An aerial photograph of the 36 plots was taken in 1998 (USGS) and is shown in Figure 1.

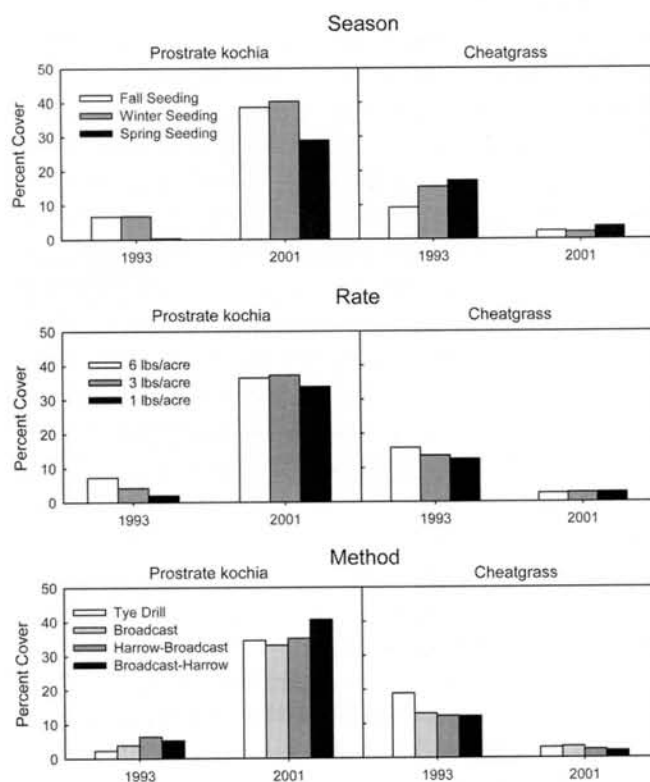
In addition, biomass of cheatgrass was measured in June 2001 and 2002 to quantify flammable, fine-

fuel loads produced by cheatgrass for 6 of the plots that had similar prostrate kochia density. These harvests were made along 5 linear transects running perpendicular to the plots. Along these transects, square wire frames (0.25 x 0.25 m) were placed at 2 locations within the middle of plots, on the plot-cheatgrass monoculture north and south boundary, and in 2 locations within the middle of the cheatgrass monoculture (north and south of each plot). Vegetation within the frames was clipped at the ground surface, collected, and then dried to obtain biomass.

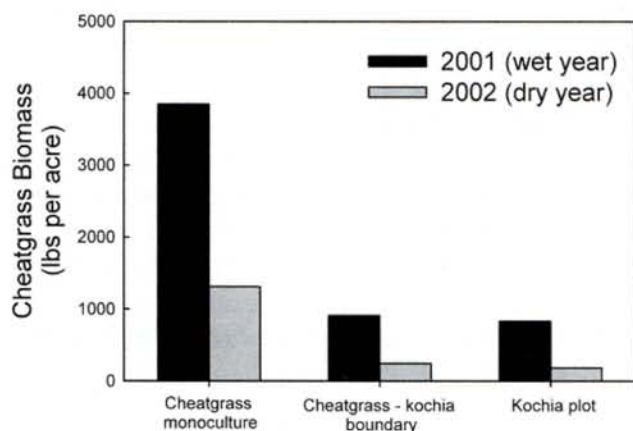
## Perennial Vegetation Persists After 10 Years

Prostrate kochia established successfully in cheatgrass monocultures regardless of seeding method, rate, or season (Figure 2). Even when establishment was initially low in Spring 1993, by 2001 prostrate kochia canopy cover was comparable to the fall and winter seedings.

Initial differences in seeding rate and seeding method observed in 1993 also diminished by 2001,



**Figure 2.** Percent cover of prostrate kochia and cheatgrass in 1993 and 2001.



**Figure 3.** Cheatgrass biomass in 2001 and 2002 at White Rocks Road research area.



**Figure 4.** Prostrate kochia plots and cheatgrass monoculture at White Rocks Road research area in Skull Valley, Utah.

suggesting that prostrate kochia density stabilizes at between 30 and 40% canopy cover for this arid salt-desert site (5 to 8 inches average annual precipitation).

Cheatgrass cover greatly decreased within plots between 1993 and 2001. These results are encouraging because they demonstrate the ability of prostrate kochia to persist 10 years after planting, while greatly reducing cheatgrass cover.

Reduced cheatgrass canopy cover within our plots translate into less cheatgrass fine-fuel loads and a reduced capacity to sustain wildfires (Harrison et al. 2002). Cheatgrass monocultures had 4 times the amount of cheatgrass biomass compared to the plots in both wet (2001) and dry (2002) years (Figure 3). Cheatgrass biomass at the cheatgrass-plot boundary was similar to values within the plots, indicating that cheatgrass does not recruit into established prostrate kochia stands at this site. One of the most striking observations is how prostrate kochia maintained these sharp boundaries with cheatgrass (Figure 4). Even after 10 years, prostrate kochia vegetation had not moved beyond where it was seeded, as has been documented for other large-scale plantings in arid regions (Harrison et al. 2000).

### Future Considerations

Although the results of this evaluation demonstrate the merit of prostrate kochia to effectively establish, persist, and reduce cheatgrass dominance, we recognize that there may be both positive and negative ecological consequences of deliberate plant introductions (e.g., Ewel et al. 1999).

A positive aspect of using this introduced shrub in greenstrips is that it rapidly establishes following disturbance, thus minimizing soil loss. A negative aspect of using this introduced shrub in greenstrips is that little is known about its compatibility with desirable native species.

Efforts to restore former shrublands now dominated by cheatgrass require re-establishing plant structure and composition and key ecosystem processes for long-term stability (e.g., McIver and Starr 2001). Frequent wildfires preclude the natural processes of regeneration and the long-term stability of shrublands of the Great Basin. The potential for progress will remain low for rehabilitating cheatgrass-dominated, fire-prone landscapes if wildfire frequency is not first reduced.

Because prostrate kochia competes well with cheatgrass and persists for many years, it appears to be one of the best candidates for inclusion in greenstrips to break up the continuity of cheatgrass fine-fuel loads.

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## Showing the Way

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## Viewpoint

# Eastern Nevada Landscape Coalition Position

There are consequences of doing nothing in natural resource management.  
What are they?

By Barry L. Perryman, Robert E. Wilson, and William I. Morrill

Fire disturbance has played an integral role in the ecology and development of semi-arid plant communities throughout western North America. Altered fire intervals and regimes since European settlement have led to pervasive alterations in species richness, diversity, fuel loads, and associated processes such as nutrient cycling and biogeochemistry within native rangeland plant communities.

Disruptions have occurred at multiple spatial and temporal scales. Consequently, values prized by society such as water quality and quantity, minimal soil erosion, wildlife and domestic animal habitat (including sagebrush and other obligate species), and ecological integrity have been compromised to varying degrees. This is particularly true in the sagebrush ecosystems of the western U.S.

Fire intervals and regimes changed in the late 1800s during European settlement as a result of newly imposed grazing systems for domestic animals, introduction of exotic plant species, construction of fire breaks (e.g., roads, crop agriculture), and fire suppression activities. Consequently, fire frequency, severity, seasonality, and spatial extent have changed.

For example, at the higher elevations and moisture levels (e.g., sagebrush-grassland communities), lengthened fire intervals have resulted in pinyon and/or juniper encroachment. This has led to progressive decreases in fine fuels while increasing woody fuel loads.

Species richness and diversity decline dramatically as overstory canopies close. In contrast, the lower elevation, drier communities (i.e., Wyoming big sagebrush-grasslands and salt desert shrub communities) have been invaded by exotic annual grasses (e.g., cheatgrass) resulting in increases in

fine fuels, decreases in woody fuels and increased fire frequency.

Cumulative non-ecological results in both of these situations are an increased risk to human life and property, and incredibly high fire management costs.

### Two Primary Concerns

Two major problems resulting from past fire suppression activities are common to the sagebrush ecosystem:

*1) Longer time periods between fires (lengthened fire intervals) at higher elevations (higher precipitation zones) have allowed various junipers and/or pinyon pines to encroach into mountain sagebrush-grassland communities.*

In the Great Basin, juniper and pinyon are relatively long-lived species (approximately 1,000 and 600 years, respectively). Depending on specific location, U.S. Forest Service researcher Robin Tausch estimates that 66 to over 90% of individual trees are less than 130 years old. Fire return intervals have increased from 12–25 years to over 100 years.

These communities lose the perennial herbaceous and shrub understory as the canopy closes in large part due to competition from the encroaching conifers. This encroachment further leads to unmanageable fuel loads and very intense fires resulting in final loss or elimination of perennial understory species, and loss of the original sagebrush habitat.

Without a healthy understory, these disturbed communities become susceptible to annual brome or other invasive species establishment, further reducing habitat quality for sagebrush obligates and other species both wild and domestic, that utilize sagebrush habitats.



*Initial pinyon-juniper encroachment into a sagebrush community.*

2) *At mid and lower elevations, longer fire intervals have created decadent, climax sagebrush systems that dominate very large areas on the landscape.*

These communities have lost the perennial herbaceous understory in large part due to competition from dense competitive sagebrush plants. The shrub overstory in these systems is continuous and contiguous leading to fuel continuities that burn hotter and more extensively than normal.

These areas have also been invaded by the introduced annual brome, "cheatgrass." This species is very successful since there are no perennial, herbaceous species to compete with. After extensive fires in these systems, cheatgrass proliferates even more because fire removes sagebrush (and other shrubs), the only competitor in the system. As fire intervals become shorter due to the fuel loading of the annual brome, areas that a single generation ago were sagebrush grasslands, can be converted to annual grasslands dominated by non-indigenous species.

The geographic scale of these problems is overwhelming. Millions of acres are currently in need of fire/fuel management and rehabilitation/restoration treatments. These problems are common to much of Nevada, including much of White Pine County.

## **Consequences Today**

Plant community succession is a dynamic process that occurs even in "hands-off" management situations. The endpoint of the successional process is not a static condition, it is in reality a cliff from which the community can fall, leading to disastrous ecological results. Consequences of doing nothing are not acceptable societal values.

**Intervention in the successional process allows society to maintain options for the future.** For instance, if we continue to allow encroachment and canopy closure of pinyon/juniper communities into sagebrush communities, understory species (including both sagebrush and herbaceous species) will disappear because they cannot compete with the conifers for water, nutrients, and light.

As these plants die off, bare ground increases under the conifer canopy. Bare ground is highly susceptible to erosion. A single, major precipitation event will move millions of tons of topsoil into stream and riparian systems, reducing water quality everywhere downstream of the source.

Bare ground is also highly susceptible to invasion by annual brome grasses and other noxious weeds. Disturbed areas are always colonized by weedy species, and when there are no native perennial species to act as a competitive buffer, introduced an-





*Late encroachment stage with corresponding disappearance of understory vegetation.*

nuals (cheatgrass) will proliferate to a point where only inputs with extremely high economic costs (re-seeding etc.) will mitigate the situation. In both scenarios, management and value options are limited.

Without topsoil, we cannot expect the area to return to a similar sagebrush ecosystem without extreme mitigation measures, (unless a several thousand year time period is acceptable to our society!).

An annual grassland will not recover and return to a sagebrush ecosystem without tremendously expensive inputs and several decades of time. If the ecological potential of a site is lowered, management and value options are decreased. For example, we cannot manage for some types of sage grouse habitat if we have no topsoil on a given area or if the area is an annual brome grassland.

**Intervention in the successional process through management of introduced fire or other means allows society to maintain management and societal value options for the future.**

## The Successional Process

Natural resource or land management is the manipulation of the successional process so the resource can provide the qualities, products, and val-

ues society desires. As land managers we can only **accelerate** and **direct** succession. We accelerate it by introducing propagules into disturbed areas rather than waiting for natural processes such as seed rain to occur.

We **direct** succession by introducing disturbances such as fire and herbivory to achieve plant community compositions that provide products or services determined by society.

Ecologists and land managers understand that a diverse landscape (in terms of the mix of different plant community types and species within those communities) provides more opportunities to achieve the objectives that society desires. In the sagebrush ecosystem, we currently have a homogenous situation rather than the heterogeneous one we desire.

Current conditions are a result of many past management practices, in particular fire suppression. Fires have been passively suppressed since European settlement by alterations in fuel loads and establishment of roads, and actively suppressed since about 1940 when motorized vehicles and aircraft with capacities to haul large quantities of water became available. For the previous 2.5 million years (since the beginning of the Pleistocene), fire was prevalent on the landscape, initiated by



both natural and for the last several millennia, anthropic ignitions by Native Americans. Fire was a “natural” intervening disturbance in the successional process, periodically removing woody vegetation such as sagebrush and pinyon/juniper, effectively setting the successional process back a few stages. Succession would then move back to stages that supported more woody vegetation, and so the process continued with this cyclic nature providing a heterogeneous landscape.

Land managers have, over the past several decades suppressed fires, effectively allowing succession to proceed to a point where we now have millions of acres supporting plant communities that are in very late seral stages, dominated or encroached by woody species. Many of these sagebrush communities have crossed successional thresholds (e.g., loss of the perennial, herbaceous understory) that will require additional inputs of energy and dollars to accelerate and direct succession in a way that society desires. We have created a homogeneous landscape that now threatens to limit our management options, reducing our ability to provide ecosystem services valued by society.

We suppressed fire for the past several decades with the approval of society because we wanted what the landscape gave us at that time. In the past we were influenced by the pristine-management-paradigm, the idea that ecological systems were static entities that could be held in a static condition if we protected them from burning and other disturbances.

We desired a condition that resembled the landscape at the time of European settlement. **We now know this was an impossible goal.**

We cannot go back to the conditions in 1850 AD. However, active dynamic disturbance regimes prior to European settlement created the landscape that fostered the values so highly prized by our society.

Plant communities do not develop to a point and become static. They continue to develop and change until some disturbance (e.g., fire) sets the successional process back to earlier stages. If we are talking about successional time scales, recovery and change are inevitable. However, centuries and millennial time scales are not acceptable to society.

We must intervene in the successional process on millions of acres before succession develops stages that are too expensive or beyond our technological abilities to mitigate in a reasonable time scale.

We must **manage** the landscape instead of taking the protection course we have been pursuing for the past several decades. By protecting it from disturbance, we severely limit or destroy our options for the future.

To be successful in this endeavor, we as a society must begin to initiate a paradigm shift with respect to our management of these lands. Past management approaches have generally been reactive. For example, large burn areas in recent years have received concentrated, intense rehabilitation efforts. The merits of fire rehabilitation are unchallenged and should continue.

However, reactive management activities have dominated land management practice while little attention has been given to proactive management. We must begin to intervene in the successional process rather than rely entirely on reactive activities and

their associated funding.

We must overcome the institutional inertia within our society, government, and land management agencies that is dedicated to the reactive management approach. We must allow disturbances to be active and manageable on the landscape. In order to achieve this paradigm shift, we must be more proactive in our management strategies.

Between 1994 and 1999, the U.S. taxpayer paid \$2,972,473,600 in fire suppression costs. Reducing fire suppression efforts by only 25% would have provided a savings of approximately \$743 million over the 6-year period. Funds that could have been invested in restoration activities to further reduce fire management costs. Over 19 million acres burned during the period. As a result, many of these acres were converted to annual grasslands that will require additional funds for rehabilitation and restoration activities.

The Nature Conservancy and others list invasive species as the second leading cause of species endangerment nationwide. About 42% of all federally threatened or endangered species are listed because

“...We must intervene in the successional process across millions of acres on our western rangelands or future generations will inherit a landscape devoid of many of the values we now enjoy.”

of threats from invasive plants. Neil West, Utah State University, estimates that 25% of the original sagebrush ecosystem is now an annual cheatgrass/medusa-head rye grassland, and an additional 25% of the sagebrush ecosystem has only cheatgrass as an understory constituent. Annual grass invasions may only be the first wave; perennial invasive species are already making serious inroads into adjoining states and Nevada as well. Potential subsequent domination by perennial invasive species will virtually eliminate any resource values for society.

Other costs of not changing our management approach, or the costs of doing nothing include: accelerated loss of topsoil, reduced water quality and quantity, riparian zone degradation, loss of riparian zone and wetland area, loss of wildlife and domestic animal forages and habitats, loss of wildlife and plant species, loss of species richness and abundance in general, loss of aesthetic appeal, loss of recreation potential, loss of western and Native American cultural values and life ways, loss of civic communities, economic depression in rural areas, loss of carbon sequestration potential, opportunity costs of fire suppression activities, lowered air quality, perhaps loss of life and property, loss of a source of national pride and environmental influence in the world community.

This trend cannot continue if we wish to preserve our options for the future. We must change our management paradigm, we must intervene in the successional process across millions of acres on our western rangelands or future generations will inherit a landscape devoid of many of the values we now enjoy.

*Note: Viewpoints expressed are those of the individual authors and not the entire SRM membership.*

### Other Reading

- Tausch, R.J. 1999.** Historic pinyon and juniper woodland development. In: Monsen, S.B. and Stevens, R., comps. Proceedings: ecology and management of pinyon-juniper communities within the Interior West; 1997 Sept 15–18; Provo, UT. Proc. RMRS-P-9. Ogden, Ut: USDA Forest Serv., Rocky Mountain Res. Stat.
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## Resource Roundup

### 2002 Top 10 States Based On Beef Cows

State	Head	% of U.S. Total
1. Texas	5,440,000	16.44%
2. Missouri	2,060,000	6.22%
3. Oklahoma	1,933,000	5.84%
4. Nebraska	1,932,000	5.84%
5. South Dakota	1,792,000	5.41%
6. Kansas	1,485,000	4.49%
7. Montana	1,451,000	4.38%
8. Kentucky	1,075,000	3.25%
9. Tennessee	1,060,000	3.05%
10. North Dakota	1,008,000	3.20%
Top Ten	19,236,000	58.11%

Source: CattleFax

### Cut Feed Costs

Dan Buskirk, Michigan State University beef cattle specialist, offers these tips for saving, rather than squandering, winter feed dollars.

- Use by-products or limit feed grains.
- Utilize crop residues during late fall and early winter.
- Stockpile forage from pastures to reduce the need for supplemental late-fall feed.
- Split the herd into feeding groups—two-year olds and thin cows in one group, and older, more dominant, higher-conditioned cows in another group.
- Compare supplement price based on energy or protein. Base your purchase on price and content of the nutrients needed.
- Control feed storage losses on hay bales. Such storage losses can easily range from 2–18%.
- Retract feeding losses. Losses of feeding large, round bale feeders may reach 20–30% of the dry matter fed. Simple differences in the design of round bale feeders can account for up to 11% of the feeding loss. Feeding bales in relatively large feeders, limiting feed supply to a daily ration and limiting access to feeders for 8–12 hours/day are all methods that may reduce feed losses.
- Test feedstuffs. Testing is the only way to determine nutrient content of forage. Spending a few dollars on forage analysis can have a high rate of return through more effective use of forage inventories.
- Provide adequate mineral and vitamin nutrition. It's important in enhancing efficiency.

- Maintain moderate-sized cows. Maintenance energy requirements are directly related to cow weight. There are several cow size indicators that astute breeders retaining replacement females will note. A few include the sire's mature weight and frame size, and his expected progeny difference (EPD) for his daughter's mature weight.

### Western Lifestyle on the Web

The Web serves up an ample number of sites dedicated to the Western lifestyle – everything from art and furniture to poetry. Start your search at Cowboy Mall ([www.cowboymall.com](http://www.cowboymall.com)) and click on “enter mall.” They have links for Western artists and galleries; Western clothing, hats and boots; and tack and saddle makers. ReadTheWest.com has a collection of links to similar sites as well as links to rodeo events and, as the name implies, Western book sellers and poetry listings.

Two fun sites to visit include [www.geocities.com/~cowpokinfun/index.htm](http://www.geocities.com/~cowpokinfun/index.htm), which has some entertaining Western humor and poetry; and [www.cowboyclipart.com](http://www.cowboyclipart.com), which offers free downloads of cattle, horse and cowboy clip art images.

Horse enthusiasts should find everything they are looking for at Horse Web ([www.horseweb.com](http://www.horseweb.com)). This site includes an impressive list of upcoming horse shows and events, a variety of articles on horse-related topics, and great links to equine associations and organizations.

For range managers, Rangelands of the Western U.S. ([//rangelandswest.org](http://rangelandswest.org)) is a collaborative effort of land-grant universities in 17 western states. It includes detailed definitions and terminology about rangelands, articles about current rangeland policy issues, and an education page with several useful ideas.

Best of all, under “general resources” the comprehensive site includes forage related publications from the Extension Service, links to each of the participating state land-grant universities, as well as links to individual forage and grazing specialists by state.

*Resource Roundup is compiled by Kindra Gordon. Contributions welcome at [kindras@gordonresources.com](mailto:kindras@gordonresources.com) or call (605)722-7699.*

## Requiescat in Pace

**John D. "Danny" Freeman, 91, died in a**



Phoenix, Arizona hospital on January 13, 2003. He and his wife, Norita, were married in Bisbee, Arizona in 1940, and moved to Prescott, Arizona in 1941. Norita and their two sons, Barrie and Wendell, daughter, Judy Power, three grandsons, one granddaughter, and one great granddaughter survive.

Danny lived over 60 years of history in Prescott and Yavapai County where he was an active participant in creating and documenting the history of many organizations. He was a charter member of the American Society of Range Management, 1948 (name changed to Society for Range Management in 1970), and he has been a part of and documented much SRM history. He chronicled his own history in an autobiography, *My First 84 Years*, published in 1995. An article in the Prescott newspaper, *The Daily Courier*, reported Danny's death with the headline, "A part of history—Historian, 'Danny' Freeman dies."

Danny was born in Tulia, Texas in 1911 and spent his early years on a Texas cattle and wheat ranch. He majored in animal husbandry and botany at New Mexico A&M (later New Mexico State University) where he received his B.S. degree in Agriculture in 1935. He began his professional career with the Soil Conservation Service in Safford, Arizona in 1935, and spent most of his career in Arizona except for a 9-month detail in 1953 as Zone Conservationist with duties in New Mexico, Colorado, Utah, and Arizona. He retired from the Soil Conservation Service in 1967. After this retirement, he signed up for an eighteen month tour of duty with the Agency for International Development to assist Vietnamese farmers improve their agricultural efficiency; in 1969, he extended his service on the project.

His record of service and participation in SRM affairs illustrates the kind of dedication that Danny

gave to organizations and causes in which he believed. He served as Arizona Section Secretary in 1953, and as part of his duties, he edited the first four issues of the Arizona Section Newsletter, the first being April 1953. He served as Arizona Section Chairman in 1954, and as Historian from 1964–69 and 1976–83. For seven years in the 1980s, Danny financially supported within the Arizona Section an "Outstanding Female Range Management Student Award," initially \$100 and \$200 in later years. As the new President of the American Society of Range Management, 1956, he expressed his feeling to members as: "To me the American Society of Range Management is just about the greatest thing that ever came into being." Danny was editor for the *Rangeman's Journal* from 1975–78, and continued as editor when the name was changed to *Rangelands* in 1979, a position he filled until February 1984. The awards which Danny received from SRM illustrate the appreciation and recognition by SRM members for his professional and dedicated service. In 1977, he received both the Outstanding Achievement Award and Fellow Award, and he received the most prestigious award made by SRM, The Frederic G. Renner Award, at the Annual meeting in Calgary, Alberta, Canada in 1982.

Danny's participation in Prescott and Yavapai County organizations and activities included Yavapai County Fair Association, Prescott Frontier Days, Smoki and Westerners, 4-H, and Yavapai County Cattle Growers. He has written and published many historical documents of these and other organizations. He completed a major publication, *World's Oldest Rodeo*, timed to match the centennial celebration of Prescott Frontier Days in 1988. He was honored in 1990 with the dedication and naming of the rock house at the fairgrounds as the Freeman Building.

Family and friends in many organizations will miss Danny.

The family has requested that any memorials be sent to:

Prescott Frontier Days Foundation  
P.O. Box 12004  
Prescott, AZ 86304





## Sneak A Peek At The Upcoming Issue Of *The Journal Of Range Management*

### Runoff and Soil Loss in Undisturbed and Roller-Seeded Shrublands

Manuel O. Aguilera, Diego F. Steinaker,  
and Manuel R. Demaria

Buffel grass is being used in Argentina to revegetate denuded areas using roller-seeding techniques. Rainfall simulation studies evaluated soil erosion and runoff for different types of denuded, shortgrass and tallgrass microsites following roller-seeding. Roller-seeding did not influence runoff or sediment loss at the microsite scale, but did reduce the proportion of the area covered by microsites that would be prone to erosion. Reduction of runoff and soil loss using management techniques that result in increased litter and replacement of shortgrass by tallgrasses will improve the water status of the area.

### Consumption and Dispersion of Mesquite Seeds by Ruminants

Charles L. Kneuper, Cody B. Scott, and William B. Pinchak

Consumption of mesquite fruit by ruminants is an important component of seed dispersal. Intake and survival of digestion of mesquite seeds from different stages of fruit maturity by 3 species of livestock was evaluated in west central Texas. Cattle readily consumed and dispersed viable mesquite seed; sheep and goats consumption may reduce the number of viable seeds, and mesquite fruit only remains on the ground for a short period of time because of consumption by livestock and wildlife. It may be possible to manipulate behavioral patterns of sheep and goats to increase intake of mesquite fruit.

### *Adesmia subterranea* Clos Germination Physiology and Presowing Treatments

Carlos A. Parera and Mónica Ruiz

Information on germination and effects of pregermination treatments on *Adesmia subterranea* "Cuerno de Cabra" seed is presented. This small flat bush is one of the scarce forage resources in the Andes mountains in South America. The mechanical and chemical scarification treatments were evaluated under a range of constant temperatures and 2 day/night cycles resembling the extreme environmental conditions of this species habitat. The observed seed dormancy can be attributed to restricted water uptake. Germination and germination velocity were increased by the scarifications treatments.

### Toxicity and Development of Tolerance in Cattle to Timber Milkvetch

W. Majak, L. Stroesser, T. Lysyk, and J.W. Hall

Timber milkvetch is a widely distributed plant in the southern interior of British Columbia, Canada that is toxic to cattle. Grazing studies were conducted to determine which class of livestock was most susceptible to poisoning, to record clinical signs of poisoning under range conditions, and to determine the efficacy of protein supplements to prevent poisoning. First-calf heifers were the most susceptible to poisoning and could show acute signs while second-calf heifers developed delayed, chronic symptoms and yearling heifers were the least susceptible. Protein supplements provided adequate protection from timber milkvetch poisoning regardless of age or history.



### Germination of Seeds of Big and Bottlebrush Squirreltail

James A. Young, Charlie D. Clements, and Tom Jones

There is considerable interest in using squirreltail species in rangeland restoration seedings, but problems with seed collection have kept seed prices very high. The germination characteristics of big and bottletail squirreltail from developmental lines and material collected from native stands were evaluated over a range of constant or alternating temperatures. There was no one temperature regime that always supported optimum germination for all of the squirreltail accessions tested. The seeds of big and bottletail squirreltail do not have the ecological amplitude of cheatgrass, but they may come closer than any other native perennial species.

### Economic and Environmental Impacts of Pasture Nutrient Management

E. Osei, P. W. Gassman, L. M. Hauck, S. Neitsch, R. D. Jones, J. McNitt, and H. Jones

In various watersheds, intensive stocking of dairy cattle on pasture has led to increased loads of nutrients to receiving waters. An integrated economic and environmental modeling system was used to simulate nitrogen and phosphorus based pasture nutrient management options on dairies in a watershed in northeast Texas. The results indicate that, at varying costs to producers, noticeable reductions in nutrient losses can be achieved by improved accounting for manure nutrients, judicious use of commercial fertilizer, and adjustments in pasture stocking density. Cost-effectiveness analysis can aid in selecting which nutrient management options are best in any given situation.

### Biological and Chemical Response of a Grassland Soil to Burning

Liliana I. Picone, Gabriela Quaglia, Fernando O. Garcia and Pedro Laterra

Changes in soil nutrients and microbial activity due to fire are important for understanding the availability of nutrients to plants. The study evaluated the effect of fire on the short-term size and seasonal dynamics of labile C and N pools after burning, and changes on soil chemical properties and microbial diversity following a fire. Microbial biomass C and N were higher in the burned treatment while after burning, there were losses in organic C and N in the soil surface. While fire can induce immediate changes in the soil, long term effects on biological and nutrient transformations are unknown.

### Fall Grazing Affects Big Game Forage on Rough Fescue Grasslands

Jeffery J. Short and James B. Knight

Prescribed cattle grazing is a tool used to enhance wildlife habitat. The effects of fall cattle grazing intensity on elk and deer forage in the following spring and summer were evaluated in west central Montana. There were no differences among grazing levels for plant species composition based on canopy coverage, species richness, and green forb standing crop variables but grazing treatments increased percent green vegetation. The sites met goals of providing livestock forage in the fall and preferred deer and elk forage in the spring and summer.

### Survival of 16 Alfalfa Populations Space Planted into a Grassland

John R. Hendrickson and John D. Berdahl

Incorporation of alfalfa into pastures and rangelands can increase the quantity and quality of forages but many alfalfa cultivars may not persist under grazing. Survival was evaluated for 16 different alfalfa populations space planted into a grassland site near Mandan, North Dakota and grazed for 4 years by cattle. Several entries with proven persistence under grazing in other areas did not persist well in this northern climate. Producers should consider the origin of alfalfa cultivars and choose ones that have been tested in their area.

### Distribution of Russian knapweed in Colorado: Climate and Environmental Factors

Sarah C. Goslee, K. George Beck, and Debra P.C. Peter

Russian knapweed (*Acroptilon repens*) is a highly aggressive introduced perennial forb. We used the locations of 528 Russian knapweed stands across Colorado in a logistic regression model with climate and environmental data. Russian knapweed occurred most frequently on fine-textured soils and in warmer, drier regions of Colorado. This statistical model can be used to focus limited management resources on areas where Russian knapweed is likely to be successful, and to predict the success of this invasive perennial in new areas.

### A Technique for Conducting Small-plot Burn Treatments

John Korfmacher, Jeanne Chambers, Robin Tausch, Bruce Roundy, Susan Meyer, and Stanley Kitchen

Burn treatments for small plots in rangeland plant studies can be difficult to execute and evaluate. We constructed a sheetmetal "burn barrel" for plots 3.4 m in diameter to contain fire and prevent the spread of fire to adjacent plots, and manufactured small, inexpensive temperature sensors to assess variation in fire characteristics. The burn barrel and sensors were used in an experiment in sagebrush-grass ecosystems in Nevada and Utah, and provided a safe and relatively uniform burn treatment. This method is useful where larger burns are undesirable due to experimental design, funds, time, or equipment availability.

### Germination of Seeds of Robust Needlegrass

James A. Young, Charlie D. Clements, and Tom Jones

Robust needlegrass is a native perennial that has great promise for use in erosion control, restoration, and ornamental plantings. The germination responses to a wide range of constant and alternating incubation temperatures were evaluated. Seeds of the grass germinate over a wide range of temperatures with maximum germination of over 75%. If alternating temperature incubators are not available, a constant temperature of 20° C should be used for determining the viability of the seed.

### Contrasting Responses of Intermountain West Grasses to Soil Nitrogen

Thomas A. Monaco, Douglas A. Johnson, Jeanette M. Norton, Thomas A. Jones, Kevin J. Connors, Jay B. Norton, and Margaret B. Redinbaugh

The role of soil nitrogen in the replacement of native perennial grasses by the invasive annual grasses cheatgrass and medusahead are not understood. A greenhouse experiment compared seedling growth of these invasive annual grasses and 5 native perennial grasses to differing N forms and availability. Root and shoot growth of the annual grasses were equal to the native grasses under low N availability, but the perennial grasses had greater root:shoot dry mass ratios across treatments. Growth and N allocation patterns provide important clues regarding the specific traits responsible for differences in competitive ability between invasive annual and native perennial grasses.

### Evaluation of USLE and RUSLE Estimated Soil Loss on Rangeland

Kenneth B. Spaeth Jr., Frederick B. Pierson Jr., Mark A. Weltz, and Wilbert H. Blackburn

The Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE 1.06) have been adapted for use on rangeland. This study evaluated rainfall simulation data from a wide variety of rangeland vegetation types. Measured erosion was compared with the USLE and RUSLE predicted soil loss and the results showed that USLE over-predicts and RUSLE under-predicts soil loss. This study shows that soil detachment and loss on rangeland can be minimal even under relatively high rainfall rates; thus, the concept and use of long-term soil loss prediction tools such as the USLE and RUSLE may be limited.



# Listening To The Land

## Sacrifice and Sustainability

by Thad Box

Gerald A. Brown, CPT. Start of tour: Thursday, June 6, 1966. Date of casualty: Tuesday, May 16, 1967. Age at time of loss: 25. Casualty type: (A1) Hostile, died. Reason: Gun, small arms fire (Ground casualty). Country: South Viet Nam.

The Wall: Panel 20E-Row 006.

I sat to write a column for the 25<sup>th</sup> anniversary of *Rangelands*—something about people who shepherded the publication over the years. A radio, playing in the background, reported on pending war. I typed “gerald brown kool aid kid” into Google. It led me to the information above.

With our talk of war—on terrorism, in Iraq or even wider wars, I have heard little about effects of war on natural resources, rangelands—sustainability. Yet wars are probably second only to drought in the way they change the land. And the cost of war is magnified many times in lost potential of people who will take care of land.

Had he lived, Jerry Brown might well be President of SRM today. He was a leader—Commander of the ROTC at Texas Tech, class officer, mover in the range club and Student Chapter SRM. In the army, he rose quickly to Captain.

Or he might have received the Renner Award. He was an A student. His research interest as an undergraduate led to a paper published in the *Journal of Range Management*. He was offered several assistantships for graduate work when he completed his Viet Nam tour.

Or he might have been Secretary of Interior. Or President. Or a pastor. He cared about the land. He cared about people. In Viet Nam, he earned the nickname, Kool Aid Kid. He solicited treats from churches in the U.S. and gave them to children in the villages where he fought.

Jerry is not the only person who has given his life for our country in past wars. And we, who live, benefit from their sacrifices. It is counter productive and divisive to speculate about value of sacrifices. But no one can doubt loss of talent in war affects sustainability of our land and our culture.

Not only do wars change landscapes with battles and bombs, wars change land area, resource availability and the economy in which land is worked. They kill people who work the land. Policy decisions to successfully wage war often alter land productivity of in perpetuity.

Our Revolutionary War, the War of 1812, and the Louisiana Purchase secured and expanded our land base. The Civil War brought horrific examples of battlefields transforming farms into wastelands. Sherman's march established forever the military effectiveness of scorched earth. Human horrors of brother fighting brother, and the human rights victory in ending slavery overshadowed war effects on the land.

Although the fighting was overseas in the two great World Wars, policies necessary to win left continuing scars on our land. During both World Wars, marginal land was plowed to produce more food. Gullies formed. Topsoil washed away. Good rangelands became poor farmlands.

In World War I, rangelands were overstocked. Good range turned from pasture to marginal grainfields. The Public Domain, unregulated at the time, became a commons for herds and flocks. National forests relaxed regulations. Indian Reservations increased livestock numbers and leased their lands to white ranchers.

When the war ended, demand for meat and wool softened. Excess animals overstocked ranges. Their owners, reluctant to take low prices, held on to their animals hoping for an improved market. Overgrazing lowered the basic productivity of most of the western range.

Between the World Wars, two significant actions interacted. The first was a natural event, the Drought of the 1930s. Ranges, already overgrazed, were subjected to a drought so severe it could have, by itself, changed pristine, ungrazed communities.

Second, national policy shifted toward conservation. The Soil Conservation Service was formed. The Taylor Grazing Act controlled grazing on the public domain. The Bureau of Reclamation built structures



for erosion control. Universities conducted research on land rehabilitation. They trained people in soils, forestry, and range management. Technical help became available for landowners. Trained managers were available for public lands.

World War II brought similar demands for increased production as did WWI, with much the same results. In addition, the cadre of land workers who were just beginning to repair damages from WWI and drought, were drafted into military service. Some did not return. Without funds or personnel, the healing effects of science rebuilding land slowed.

The two World Wars, and their aftermath, rank as some of the most significant events affecting land productivity. Later wars—the Korean conflict, Viet Nam, more recent political wars—changed the land more indirectly through economics, social change, and loss of human potential. But all wars, large and small, affect the land—by direct action, through policy decisions, and through loss of people.

The principle of overuse, either deliberate or through ignorance, of an essential resource for short term gain is the important issue. That issue must be the center of every debate if we are to have a sustainable society. And healthy land must be the baseline from which we start.

About a decade ago, I stood by a black granite slab in Washington D.C. that honors those who died in Viet Nam. On Panel 20E, Row 006, I found the name of Gerald Brown.

Sacrifice is a key ingredient in war. The dictionary says sacrifice is something voluntarily given up for an ideal or a belief, as in sacrificing a child for a deity. *We go into war knowing we will have to sacrifice some of our children. If we continue in war without a clear understanding of its effect on the land, we sacrifice the livelihood of generations yet to come.* Sacrifice is honorable—but only if we know what belief, or what deity, is worth voluntarily giving up a Gerald Brown. What is sustainability worth?

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# Browsing The Literature

Jeff Mosley

This section reviews new publications available about the art and science of rangeland management. Personal copies of these publications can be obtained by contacting the respective publishers or senior authors (addresses shown in parentheses). Suggestions are welcomed and encouraged for items to include in future issues of *Browsing the Literature*.

## Animal Ecology

**Aboveground invertebrate responses to land management differences in a central Kansas grassland.** J.L. Jonas, M.R. Whiles, and R.E. Charlton. 2002. *Environmental Entomology* 31:1142-1152. (The Nature Conservancy, P.O. Box 1745, North Platte, NE 69101). Native tallgrass prairie favored beetles, but grasshoppers preferred fields planted to smooth brome.

**Influence of winter weather and shelter activity patterns of beef cows.** B.E. Olson and R.T. Wallander. 2002. *Canadian Journal of Animal Science* 82:491-501. (Dept. of Animal and Range Sciences, Montana State Univ., Bozeman, MT 59717). "Instead of minimizing energy expended by lying down during extreme cold, cattle spent more time standing, which maximizes heat gain from solar radiation."

**Invertebrate biomass: associations with lesser prairie-chicken habitat use and sand sagebrush density in southwestern Kansas.** B.E. Jamison, R.J. Robel, J.S. Pontius, and R.D. Applegate. 2002. *Wildlife Society Bulletin* 30:517-526. (Division of Biology, Kansas State Univ., Manhattan, KS 66506). Management practices that favor forbs will increase invertebrates and improve habitat quality for lesser prairie-chickens.

## Grazing Management

**Conservative and moderate grazing effects on Chihuahuan Desert wildlife sightings.** J. Joseph, M. Collins, J. Holechek, R. Valdez, and R. Steiner. 2003. *Western North American Naturalist* 63:43-49. (J. Holechek, Dept. of Animal and Range Sciences, New Mexico State Univ., Las Cruces, NM 88003). Total wildlife, total gamebird, and total songbird sightings did not differ between light and moderate livestock grazing, but black-tailed jackrabbits were sighted more often on moderately grazed pastures.

**Effects of supplemental energy and/or degradable intake protein on performance, grazing behavior, intake, digestibility, and fecal and blood indices by beef steers grazed on dormant native tallgrass prairie.** T.N. Bodine and H.T. Purvis. 2003. *Journal of Animal Science* 81:304-317. (H. Purvis, Dept. of Animal Science, Oklahoma State Univ., Stillwater, OK 74078). Supplementation with corn reduced forage intake, whereas supplementation with soybean meal increased forage intake.

**Liquid supplement and forage intake by range beef cows.** B.F. Sowell, J.G.P. Bowman, E.E. Grings, and M.D. MacNeil. 2003. *Journal of Animal Science* 81:294-303. (J. Bowman, Dept. of Animal and Range Sciences, Montana State Univ., Bozeman, MT 59717). Liquid protein supplementation in winter increased forage digestibility and intake. Forage consumption was greater when supplement was dispensed via a computer-controlled lick-wheel feeder rather than a conventional, *ad libitum* lick-wheel feeder.

## Hydrology/Riparian

**Effects of livestock grazing on benthic invertebrates from a native grassland ecosystem.** G.J. Scrimgeour and S. Kendall. 2003. *Freshwater Biology* 48:347-362. (Alberta Conservation Association, P.O. Box 40027, Baker Center Postal Outlet, Edmonton, AB T5J 4M0, Canada). Abundance of streambed invertebrates was unaffected by summer cattle grazing in southern Alberta.

**Influences of herbivory and water on willow in elk winter range.** L.C. Zeigenfuss, F.J. Singer, S.A. Williams, and T.L. Johnson. 2002. *Journal of Wildlife Management* 66:788-795. (U.S. Geological Survey, 4512 McMurry Ave., Fort Collins, CO 80525). Elk browsing and grazing has suppressed willows and herbaceous productivity in willow communities of Rocky Mountain National Park. Recommends that elk herbivory must be reduced to reestablish sustainable willow communities.

**Reflectance characteristics and remote sensing of a riparian zone in South Texas.** J.H. Everitt, C. Yang, D.E. Escobar, R.I. Lonard, and M.R. Davis. 2002. *Southwestern Naturalist* 47:433-439. (USDA-ARS, 2413 E. Hwy. 83, Weslaco, TX 78596). Remote sensing technology accurately mapped vegetation, water, and bare soil/roads into 8 classes.

**Using breeding land birds in the assessment of western riparian systems.** T.A. Rich. 2002. *Wildlife Society Bulletin* 30:1128-1139. (U.S. Fish and Wildlife Service, 1387 S. Vinnell Way, Boise, ID 83709). Proposes a simple method for adding an assessment of bird species abundance into Proper Functioning Condition (PFC) assessments of riparian health.

## Improvements

**Interactive effects of *Aphthona nigriscutis* and picloram plus 2,4-D in leafy spurge (*Euphorbia esula*).** J.A. Nelson and R.G. Lym. 2003. *Weed Science* 51:118-124. (R. Lym, Dept. of Plant Science, North Dakota State Univ., Fargo, ND 58105). Leafy spurge control was increased due to the additive effects of herbicide toxicity to root tissue and flea beetle larvae feeding on root buds.

**Physiological impacts of biosolids application in desert grasses.** R. Mata-Gonzalez, R.E. Sosebee, and C. Wan. 2002. *Environmental and Experimental Botany* 48:139-148. (MWH Energy & Infrastructure, Inc., 760 Whalers Way, Suite A-100, Fort Collins, CO 80525). Application of biosolids increased the leaf area of blue grama and tobosagrass in southwestern Texas.

**Use of mefluidide to alter growth and nutritive value of pearl millet.** L.A. Redmon, F.M. Rouquette, and M.J. Florence. 2003. *Journal of Plant Nutrition* 26:279-296. (F. Rouquette, Texas Agricultural Experiment Station, Overton, TX 75684). Application of mefluidide, a growth regulator, successfully reduced the growth rate of pearl millet while increasing the plant's leafiness and nutritive value.

**Vegetation management practices on Conservation Reserve Program fields to improve northern bobwhite habitat quality.** K.C. Greenfield, L.W. Burger, Jr., M.J. Chamberlain, and E.W. Kurzejeski. 2002. *Wildlife Society Bulletin* 30:527-538. (Dept. of Wildlife and Fisheries, Mississippi State Univ., Mississippi State, MS 39762). Recommends strip-disking CRP fields in the midwestern and southeastern U.S. to benefit northern bobwhite quail.

**Winter burning and the reduction of *Cornus sericea* in sedge meadows in southern Wisconsin.** B. Middleton. 2002. *Restoration Ecology* 10:723-730. (U.S. Geological Survey, 700 Cajundome Blvd., Lafayette, LA 70506). Prescribed fire in winter did not control shrub encroachment into wet meadows, but burning did help maintain plant species richness.

#### *Measurements*

**A nested-intensity design for surveying plant diversity.** D.T. Barnett and T.J. Stohlgren. 2003. *Biodiversity and Conservation* 12:255-278. (Natural Resource Ecology Lab, Colorado State Univ., Fort Collins, CO 80523). Estimates of plant species richness were improved when sites were sampled with both large macroplots and small quadrats.

**Remote sensing of Macartney rose in the Texas Coastal Prairie.** J.H. Everitt, C. Yang, R.F. Wilson, M.A. Alaniz, and M.R. Davis. 2002. *Southwestern Naturalist* 47:566-575. (USDA-ARS, 2413 E. Hwy. 83, Weslaco, TX 78596). Color-infrared aerial photography in late winter was used to accurately map Macartney rose infestations.

#### *Plant-Animal Interactions*

**Effect of local and regional processes on plant species richness in tallgrass prairie.** S.L. Collins, S.M. Glenn, and J.M. Briggs. 2002. *Oikos* 99:571-579. (National Science Foundation, Division of Environmental Biology, Rm. 635, Arlington, VA 22230). Plant species richness was higher in grazed compared to ungrazed tallgrass prairie in Kansas.

**Gopher-plant-fungal interactions affect establishment of an invasive grass.** V.T. Eviner and F.S. Chapin. 2003. *Ecology* 84:120-128. (Institute of Ecosystem Studies, Box AB, Millbrook, NY 12545). Gopher activity inhibits a complementary relationship between a fungus and seeds of barbed goatgrass. In this way, gopher activity limits the invasiveness of barbed goatgrass.

#### *Plant Ecology*

**Montana sagebrush guide.** C.L. Wambolt and M.R. Frisina. 2002. Montana Dept. of Fish, Wildlife and Parks. (Dept. of Animal and Range Sciences, Montana State Univ, Bozeman, MT 59717). This 71-page booklet provides a taxonomic key, photographs, and habitat descriptions for the 16 different types of sagebrush in Montana.

**Overlapping resource use in three Great Basin species: implications for community invasibility and vegetation dynamics.** M.S. Booth, M.M. Caldwell, and J.M. Stark. 2003. *Journal of Ecology* 91:36-48. (Marine Biology Lab, 7 MBL Street, Woods Hole, MA 02543). Provides further evidence that bottlebrush squirreltail plants suppress cheatgrass which, in turn, benefits seedling recruitment of big sagebrush.

**Vegetation patterns as affected by aspect and elevation in small desert mountains.** R. Mata-Gonzalez, R.D. Pieper, and M.M. Cardenas. 2002. *Southwestern Naturalist* 47:440-448. (MWH Energy & Infrastructure, Inc., 760 Whalers Way, Suite A-100, Fort Collins, CO 80525). Plant species richness was unaffected by elevation but was greater on drier aspects (i.e., south- and west-facing slopes).

#### *Reclamation/Restoration*

**Burning and seeding influence soil surface morphology in an *Artemisia* shrubland in southern Idaho.** J.H. Hilty, D.J. Eldridge, R. Rosentreter, and M.C. Wicklow-Howard. 2003. *Arid Land Research and Management* 17:1-11. (Bureau of Land Management, 400 West F St., Shoshone, ID 83352). After wildfire in sagebrush steppe, drill seeding provides long-term benefits to vegetation and soils that outweigh the initial, short-term disturbance associated with drill seeding.

**Grassland vegetation and bird abundances on reclaimed midwestern coal mines.** P.E. Scott, T.L. De Vault, R.A. Bajema, and S.L. Lima. 2002. *Wildlife Society Bulletin* 30:1006-1014. (Dept. of Life Sciences, Indiana State Univ., Terre Haute, IN 47809). Reclaimed mine grasslands support an array of midwestern grassland bird species similar to native grasslands.

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## SRM Awards

Presented at the Society's 56<sup>th</sup> Annual Meeting in Casper, Wyoming on February 5, 2003  
Presenting the awards is SRM President Rod Heitschmidt

### Frederic G. Renner Award

*The Frederic G. Renner Award is the highest award bestowed by the Society for Range Management. The award is named for one of SRM's founding fathers and second president.*



Mr. and Mrs. Stan Tixier

**Stan Tixier** graduated from the University of Arizona with the aid of a scholarship from the Arizona Section, and served as a Student Chapter officer, thus beginning a lifetime of involvement with, and commitment to, the Society for Range Management.

Mr. Tixier chose to spend his entire career as a public servant with the U.S. Forest Service. He was a range conservationist, district ranger, range staff officer, forest supervisor, as well as other positions at both the regional and national levels. He served as deputy regional forester, and ended his 32-year career as regional forester of the Intermountain Region in Ogden, Utah. Throughout his career, he was a vigorous SRM promoter and continually focused his agency on the importance of rangeland management as a part of the multiple-use framework. His decision to retire coincided with his assuming the role of president of this Society in 1991, because of the time he felt was necessary to properly carry out the duties.

Stan served on several committees at the section level, and was president of

the New Mexico Section. He has served on, and chaired, numerous committees at the parent Society level. He was involved in the creation of *Rangelands* magazine and the establishment of the Excellence in Range Management Committee. Stan was honored with the SRM Sustained Lifetime Achievement award in 1997. He remains active in SRM, and is a stalwart on the Endowment Fund Board of Governors and volunteer for their silent auctions and raffles as fund-raising activities. Proceeds from his Cowboy Poetry book and tapes have added to that Fund. He is currently serving as Chairman of the Host Committee for the 57<sup>th</sup> Annual Meeting to be held next year in Salt Lake City.

### W.R. Chapline Research Award

*The W.R. Chapline Research Award was established in 1986 to provide recognition to members of SRM for exceptional research accomplishments in range science and related disciplines.*



Dr. and Mrs. Alma Winward

**Dr. Alma H. Winward's** outstanding accomplishments span 35 years. His contributions have not been limited to any one focus area, but include notable accomplishments in all of the following areas: conducting range research, teach-

ing rangeland management, practicing rangeland ecology, and implementing applied technology in furtherance of sound management.

Dr. Winward—quiet, soft-spoken, and unassuming—defers his doctorate title to simply being called "Al". He approaches his work as Rangeland Ecologist with the Forest Service in Ogden with an unmatched reverence and passion. Al has authored almost 100 scientific and technical articles on such topics as sagebrush taxa and ecological relationships, ecosystem inventory and analysis, rangeland shrub genetics and variations, plant community and habitat types, and grazing effects on rangelands.

He has helped establish over 100 reference areas in the Intermountain area to monitor short- and long-term management effects. Al was instrumental in developing the first riparian vegetation classifications in the West. He developed the Riparian Greenline, Riparian Cross Section, and Woody Plant Species Regeneration interagency monitoring procedures in use nationally.

Dr. Winward's expertise and practical applications in sagebrush, wildland shrub, riparian, aspen, and tall-forb ecosystems are of West-wide renown. He is one of the foremost authorities on the taxonomy and ecology of sagebrush; that expertise has earned him the title of "Mr. Sagebrush" or "Artemesia Al" from his colleagues and students.

Perhaps no other individual has made greater contributions in so many areas of the science and art of rangeland management in the western United States—benefiting wildlife, fisheries, watersheds, and livestock operations—than Al Winward.



## W.R. Chapline Stewardship Award

The W.R. Chapline Stewardship Award was created in 1986 to provide recognition to members of SRM for exceptional accomplishments and contributions to the art and science of range management through specific rangeland entities.



**Charles McGlothlin and Mr. and Mrs. Wesley Hyatt**

**Mr. Wesley Hyatt** has spent all his adult life striving for and achieving excellence in rangeland management—a span of only 60-some years! His Wyoming ranch is a showcase of his accomplishments. He was an early pioneer in sagebrush management, development of livestock water with the use of plastic pipe, and management of juniper stands with fire. Wesley gained his knowledge of rotational grazing from Gus Hormay, and learned high intensity-short duration grazing from Leo Merrill. The Hyatt Ranch has been a favorite stop for rangeland managers for several decades.

Numerous articles have been published in the *Journal for Range Management* and *Rangelands* on the Hyatt Ranch and Wesley Hyatt's accomplishments in rangeland management. For many years, the ranch has served as a learning center for range management, a demonstration site for rangeland management tools, and an educational site for Wyoming's youth range camp. Wes has been faithful in his attendance at section, national, and many international SRM meetings, given numerous presentations, and he served on the Board of Directors 30 years ago.

Wesley's leadership brought the family ranch from a unit grazed by livestock following green-up to a showcase for high intensity-short duration grazing system use. He is a living example of "working outside of the box."

## Outstanding Achievement Award

The Outstanding Achievement Award is presented to individuals or groups for eminently noteworthy contributions in advancing the science and art of range management.



**Alfred H. Bawtree**

**Alfred H. Bawtree** has provided exemplary service to the rangeland management profession for 47 years. Mr. Bawtree's 35-year public service rangeland career began with the British Columbia Ministry of Forests. He was the first Range Specialist in the Ministry of Agriculture, Food and Fisheries, with responsibility for range extension throughout the Province. He worked closely with E. William Anderson to develop coordinated resource management plans with ranchers and Ministry officials. He was a major author of the *Rangeland Handbook* for British Columbia, and has served as Director of the Province Grassland Conservation Council.

He participated in the development of a rangeland seeder that was introduced to the Vegetation Rehabilitation & Equipment Workshop at the annual meeting held here in Casper 24 years ago.

Alf Bawtree demonstrates the art and the science of rangeland management to employees and to the ranchers that make it work on the ground. His extensive experience, combined with common sense and a wry humor, make him a much sought-after speaker for field days.

He has been an active member of the Society throughout his career, particularly in the Pacific Northwest Section.



**Donald R. Blumenauer**

**Donald R. Blumenauer** served as an agrologist with the British Columbia Ministry of Forests and Ministry of Agriculture, Food, and Fisheries for 34 years. He is known throughout the Pacific Northwest as an outstanding rangeland manager, rehabilitation specialist, livestock planner, and a superb photographer. He has developed dozens of Coordinated Resource Management Plans across British Columbia.

Mr. Blumenauer has aggressively educated the public and agencies about noxious weeds, emphasizing prevention of invasive species. He has been involved in numerous research and monitoring trials, including bio-control programs. His revegetation expertise has served well a number of mine reclamation committees, including several open-pit operations.

Mr. Blumenauer's people skills, as well as his technical expertise, are noteworthy for his ability to bridge gaps between people and bring groups to consensus. His first professional love has always been the Society for Range Management, and he has often stated that his success as a range extension specialist is "largely due to membership in SRM by keeping abreast of new and changing resource technology and by dialogue with its many talented members."

## Outstanding Achievement Award (Continued)



**Dr. John Brock**

**Dr. John Brock** has made outstanding contributions to rangeland management with his teaching, leadership, and mentoring. His knowledge and abilities have been especially noteworthy in developing monitoring protocols for riparian areas and uplands, helping to develop a multi-agency rapid assessment to evaluate riparian conditions, and coordinating a monitoring program where Arizona State University students carry out monitoring efforts on the Tonto National Forest, thereby developing expertise and valuable results for both the students and the agency.

Dr. Brock has served on Arizona's Rangeland Advisory Council for the Bureau of Land Management, the Commission on Arizona Environment, and has twice served on research project review panels for the Environmental Protection Agency in Washington.

John joined SRM during his undergraduate studies at Fort Hays State University, and continues to actively serve at both the section and parent Society levels. Dr. Brock is truly an inspiration to rangeland managers. No matter how busy, he always has time to return phone calls and e-mail. He is legendary for providing lifelong mentoring and consultation service to his graduates and others with whom he works.



**James Everitt**

During his 30-year research career, **James Everitt** has earned an international reputation as an authority on the development of remote sensing technologies and their application to rangeland management and conservation. He pioneered the use of remote sensing for identifying individual plant species, plant communities, and ecosystem characteristics. He developed the use of video imagery for near real-time analysis of vegetation, and also developed a high-resolution, multi-spectral, airborne, 3-camera digital video system that is used by dozens of companies, agencies, and universities today to distinguish plant species and communities.

Mr. Everitt is widely recognized as an authority on the botany and plant taxonomy of his region. In addition to well over 200 publications advancing the science of rangelands on a variety of topics, he has authored and co-authored three comprehensive flora and field guides to the vegetation of south Texas.

Mr. Everitt has been a member of the Society throughout his career, and is especially active and involved in the Texas Section.



**Dr. Elaine Grings**

**Dr. Elaine Grings**, currently with the USDA/ARS at Miles City, Montana, has played a significant role in range nutrition research in the western United States and the northern Great Plains. Her work has focused on removing nutrient limitations to production; improving nutrient use and reducing loss of nutrients; and improving management practices for beef production from rangelands, pastures, and forages.

Dr. Grings has transferred nutrient information and application to livestock producers and agency personnel through presentations at producer meetings, tours, and field days. She has shared information through newspaper and magazine interviews, agricultural press publications, and extension bulletins. She has spoken at numerous meetings, including the Montana Governor's Range Tours and Grazing Seminars.

She has been a member of SRM throughout her professional career, and is well known for her tireless and selfless dedication to the Northern Great Plains Section, as well as to her community. She enjoys a reputation for always being there when needed, in any capacity, to get the job done.

## Outstanding Achievement Award

(Continued)



**Dr. Thomas A. Jones**

**Dr. Thomas A. Jones** has spent nearly all his 16-year rangeland career as a research geneticist with the Forage and Range Research Laboratory in Logan, Utah. He is widely recognized as an authority on the biology of cool-season native grasses throughout western North America.

Dr. Jones was instrumental in assembling a broad collection of important native grasses. He led 17 seed collection expeditions in the western U.S. and two in Canada. These collections and their incorporation into the U.S. National Plant Germplasm System will have a lasting influence on revegetation and restoration programs in western North America for many years to come. His efforts also were critical in establishing the new scientific *Native Plants Journal*.

He has authored numerous publications, several book chapters and proceedings, and is a prominent presenter throughout the western U.S. concerning native grass species.



**Jerry Pierce**

**Jerry Pierce** has been a rangeland management specialist with the Bureau of Land Management in Montana and Wyoming for his entire 30-year career. He is being recognized for his long-standing efforts with Coordinated Resource Management Planning in southwestern Wyoming.

The Cumberland/Uinta CRM has been an extremely contentious project for nearly a decade, and involves critical riparian area management issues over nearly half a million acres in some of the earliest-settled area of the state. There were extreme pressures exerted throughout the process from outside affected interests. During changes in agency leadership and policy, and steering committee membership, Jerry never wavered in his professionalism and fairness to all. His quiet, unassuming manner was a major factor in bringing all the diverse interests together in the development of a workable plan for what was the largest unfenced BLM allotment in the U.S.

Mr. Pierce's contributions to the art and science of rangeland management are best exemplified through the continual leadership role he played in bringing the group to final consensus for the Cumberland/Uinta CRM.

## Fellow Award

*The Fellow Award is bestowed upon members of SRM in recognition of exceptional service to the Society and its programs.*



**Dr. William C. Krueger**

**Dr. William C. Krueger** has led the Department of Rangeland Resources at Oregon State University for 24 years. During his tenure, he has been responsible for nearly a ten-fold increase in the departmental faculty and the creation of a branch campus system. Through his leadership, viable research and teaching programs are now available in virtually every corner of the state.

Dr. Krueger has been a stalwart in the Society during his 30 years of membership. At the section level, he has served on several committees. He has been a member of the Board of Directors, and has served as President, and was presented the Pacific Northwest Section's Trail Boss Award.

At the parent Society level, he has served in myriad capacities that include membership (and frequently the Chair) on a dozen committees. He has served on the Editorial Board for *Rangeman's Journal* and been active in the Range Science Education Council. He has conducted SRM accreditation reviews of four leading universities.

Perhaps one of Dr. Krueger's greatest achievements has been his leadership in a special SRM task force that was commissioned to re-write the federal agency rangeland conservationist standards. His day-to-day leadership and inspiration in SRM have been superior.



### Fellow Award (Continued)



**Dr. Patrick E. Reece**

**Dr. Patrick E. Reece** has been active in rangeland management during his professional career of 24 years as Rangeland Ecologist with the University of Nebraska. His leadership in the development of the Nebraska Ranch Practicum has been one of his greatest educational achievements – a combined classroom and “hands-on” learning experience to integrate livestock and natural resources management that has been responsible for increasing the knowledge of nearly 1,700 individuals and improved management on over a million and a half acres of rangeland.

Pat has been very active in the leadership and annual workings of the Nebraska Section, serving on several committees and as Section President. He has been an active member of the core planning and teaching group of the Nebraska Range Shortcourse since 1978. Dr. Reece has also been a member of numerous committees at the parent Society level, among them the Youth Forum Committee, and served as a Chair of several of them. He has served as judge for the Graduate Student Paper Contest for many years.

Throughout his career, Dr. Reece has been involved in rangeland management education for youth, including serving as director of the Nebraska Range Youth Camp. His career-long participation in and support of youth education is, in itself, a noteworthy achievement.

### Sustained Lifetime Achievement Award

*This award is presented to SRM members for long-time contributions to the art and science of range management and to the Society for Range Management.*



**Dr. John E. Mitchell**

**Dr. John E. Mitchell** has spent over 40 years in research, starting as a graduate student at Utah State University. Dr. Mitchell, a USDA employee at the Rocky Mountain Forest and Range Research Station in Fort Collins and an Affiliate Professor at Colorado State University, has worked on a wide array of rangeland issues in the West, focusing on problems dealing with assessment, conflicting uses, and sustainability of rangeland resources and ranching as a way of life. His research efforts have included addressing soil cover variables, recreation and livestock conflicts, as well as indicators to assess biodiversity, rangeland health and vitality, and socio-economic-political conditions.

Dr. Mitchell assumed the duties of national RPA rangeland assessment specialist in 1995, continuing his work with criteria and indicators of sustainable development of rangelands. He currently leads a national Sustainable Rangeland Roundtable responsible for developing and validating indicators of sustainable rangeland management within the framework of the seven criteria defined by the Montreal Process.

John has been an active member of SRM for 43 years, serving as committee member and officer in the PNW, Idaho, and Colorado Sections. He has served on numerous committees at the parent Society level, chaired several, and is currently an Associate Editor of *Rangelands*.

Dr. Mitchell is currently conducting research to analyze the extent and effects of urban development and subdivision on

plant communities and rangelands in the Rocky Mountains and along the Front Range. For his continued commitment to providing information and direction to foster sustainability of rangelands throughout the West, the Society is proud to recognize Dr. John Mitchell with its Sustained Lifetime Achievement Award.



**Dr. Gerald E. Schuman**

Throughout his highly distinguished research career, **Dr. Gerald E. Schuman** has utilized creative partnerships among managers, businesses and corporations, and local, state, and federal agencies to address environmental issues with appropriate rangeland management practices.

An employee of the Agriculture Research Service's High Plains Grasslands Research Station in Cheyenne, Dr. Schuman's world-renowned research program has emphasized land reclamation and carbon sequestration as related to global climate change and rangeland management practices. Jerry is internationally recognized as a leading expert in mined land reclamation and soil carbon dynamics, and his expertise has been requested and applied to land management on five continents.

Jerry is active in the Soil Science Society, Society of Agronomy, Soil and Water Conservation Society, and the American Society of Mining and Reclamation. He has been active in SRM at the Wyoming Section level, including serving as President, and has been a member of several committees at the parent Society level. He is a past Associate Editor of the *Journal of Range Management*.

### Outstanding Young Range Professional Award

*The Outstanding Young Range Professional Award was inaugurated by SRM in 1988 to recognize the promise and potential of our younger members. One of the major criteria for this important award is the age of the nominees, who must have been less than 35 years old on January 1, 2003.*



**Keith Dale Klement**

**Keith Dale Klement**, with USDA/ARS at Miles City, Montana, is highly motivated, with a deep and abiding love for rangelands and an obvious desire to manage and conserve them for future use. He's a willing volunteer at every opportunity to promote rangelands and to educate others about their importance for a variety of multiple uses and values. Keith has been involved in SRM since he began his undergraduate education at Texas Tech; his field studies have also taken him to Oklahoma, Wyoming, and now Montana. His contributions to his sections and the parent Society are widely noted.

Keith has donated countless hours of his time to motivate and educate generations of all ages about the importance of rangelands. Because of his knowledge and desire to promote sound management, 4-H clubs, FFA chapters, and federal and state agencies contact him regularly to seek advice or assistance regarding ecological issues.

Mr. Klement's honesty, integrity, enthusiasm, and dedication serve as an outstanding example for the youth of today to follow in the management of our natural resources.

### RSEC Undergraduate Teacher Award



**Val Jo Anderson**

**Dr. Val Jo Anderson** is presented the Range Science Education Council (RSEC) Undergraduate Teaching Award for 2003. He has been a prominent member of the faculty of the Department of Integrative Biology (formerly Botany and Range Science) at Brigham Young University (BYU) since 1988. Professor Anderson is a champion of undergraduate education. He is passionate about teaching and his students are regular beneficiaries of his extraordinary skills.

Dr. Anderson believes the primary purpose of a university is to provide an opportunity for the acquisition, application and advancement of knowledge. As Chair of the BYU Range Curriculum Committee, he has provided leadership instrumental in crafting nationally recognized degree programs that have maximized benefits to students and the range management profession. He has developed and taught courses in 7 subject areas that integrate textbook knowledge with management problems and situations. He has developed a strong network of agency professionals throughout the West that provides opportunities for students to gain practical work experience.

Dr. Anderson exemplifies excellence in teaching and mentoring. Students are enthusiastic about his teaching style, noting that his courses are challenging and rich in content. His zest for teaching and concern for the welfare of students both in and out of the classroom has been inspirational and has motivated students to work hard, plan ahead and qualify for positions of responsibility and leadership.

Dr. Anderson serves on the SRM Student Affairs Committee as chair of the Undergraduate Student Technical Paper Session. He has been an active member of the Range Science Education Council and served its president in 1995-96. He has also been active in the Utah Section SRM serving as president (1996-97), chair of the Information and Education Committee and currently as a member of the Scholarship Committee. Since 1990, he has coached the BYU Plant Identification and URME teams. He has trained students in the Public Speaking Contest, and has mentored 26 students who presented undergraduate papers at SRM meetings. During the last decade he has mentored more than 70 undergraduates as participants in funded research.

Val chose to be a teacher and is untiring in his service to students. They and his colleagues recognize him as a gentleman and team player who works hard to enrich the educational experience of students to the benefit of the profession and society.

### Outstanding Rangeland Manager Award



**Bob Ross accepting for Bob and Cathy Lee**

Bob Ross accepting the Outstanding Rangeland Manager Award for **Bob and Cathy Lee** of Judith Gap, Montana.

# 2003 Annual Meeting Winners

## High School Youth Forum Winners



**1st Place:** Aaron Jennings (Texas Section) and President Rod Heitschmidt.



**2nd Place:** Levi Newkirk (New Mexico Section) and President Rod Heitschmidt.



**3rd Place:** Lori Frederick (Southern Section) and President Rod Heitschmidt.



**4th Place:** Robin Morris (Texas Section) and President Rod Heitschmidt.



**5th Place:** Ely Johnson (Northern Great Plains Section) and President Rod Heitschmidt.



## Undergraduate Range Management Exam Winners

### Team



**1st Place:** (Brigham Young University) (Alphabetically) Daniel Eddington, Rachel Fugal (1st Place Individual), Ryan Huish, Thomas Krebs, Taina Matheson (3rd Place Individual), Tim Royer, Matt Stevenson, Ruth Walker, and President Rod Heitschmidt.



**2nd Place:** (University of Alberta) (Alphabetically) Grant Chapman (2nd Place Individual), Danielle Gabruck, Adam Kilburn, Cameron Klause, Nicole Koskie, Angela Pfeiffer and President Rod Heitschmidt.



**3rd Place:** (University of Wyoming) (Alphabetically) Angela AJ Buhler, Jason Crouder, Kyle Hagerty, Jordana Lafantasia, Curtis Nixon, Tever Thomas, Michael Wells, and President Rod Heitschmidt.

### Individual



**1st Place Individual USFS Award:** Larry D. Bryant, Forest Service, Washington D.C. and Rachel A. Fugal (Brigham Young University).



**2nd Place:** Grant Chapman (University of Alberta) and President Rod Heitschmidt.



**3rd Place:** Taina Matheson (Brigham Young University) and President Rod Heitschmidt.



**4th Place Tied:** (University of Sask.) (Alphabetically) Steve Hankey, Alicia Hargrave, Julie Korol (4th Place individual tied), and President Rod Heitschmidt.



**4th Place Individual (tied):** Joanne Kelly (Colorado State) and President Rod Heitschmidt.



**4th Place Tied:** (South Dakota State University) (Alphabetically) Boyce Baker, Gene Baker, Nicole Hansen, Kristin Malo, Thomas Nadgwick, Derek Oliver, LaCaylla Ritter, and President Rod Heitschmidt.



**4th Place Individual (tied):** Julie Korol (University of Saskatchewan) and President Rod Heitschmidt.



**4th Place Tied:** (University of Nebraska-Lincoln) (Alphabetically) Nick Haack, Ben Keep, Justin Linder, Kristin Nollette, Tim Roggasch, Jessica Warner, and President Rod Heitschmidt.

## Masonic Scholarship



Robin Morris (Texas Section) and President Rod Heitschmidt.

## Range Plant Identification Winners

### Team



**1st Place:** (Universidad Antonio Narro) (Alphabetically) **Victor Hugo Resendiz Arvizu** (5th Place Individual), **Eduardo Ponce Castro** (3rd Place Individual), **Edgar De Anda** (2nd Place Individual), **Abid Francisco Moo Cruz** (1st Place Individual) **Pascual Gallegos**, **Damian Gaytan**, **Mario Gonzalez**, **Miguel Grageda**, **Jaurer Ochoo**, and **President Rod Heitschmidt**.

### Individual



**1st Place BLM Award:** **Tim Reuwsaat** from the BLM and **Abid Francisco Moo Cruz** (Universidad Antonio Narro).



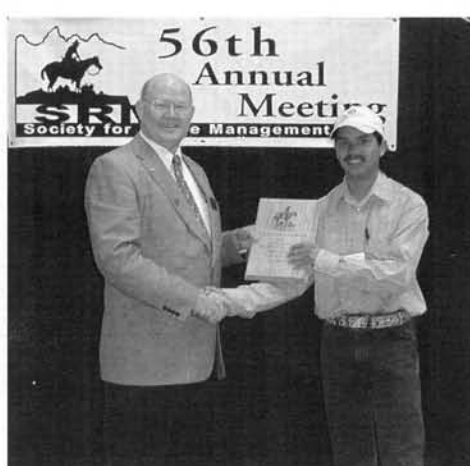
**2nd Place:** (Brigham Young University) (Alphabetically) **Neal Bryan**, **Daniel Eddington**, **Rachel Fugal**, **Ryan Huish**, **Thomas Krebs**, **Taina Matheson**, **Matt Stevenson**, **Tim Royer**, **Ruth Walker**, and **President Rod Heitschmidt**.



**2nd Place:** **Edgar Gerardo De Anda Villarreal** (Universidad Antonio Narro) and **President Rod Heitschmidt**.



**3rd Place:** (Texas A&M University) (Alphabetically) **Courtney Hale**, **Lucas Hubble**, **Deanne Masur**, **Ed Rhodes**, and **President Rod Heitschmidt**.



**3rd Place:** **Eduardo Ponce Castrol** (Universidad Antonio Narro) and **President Rod Heitschmidt**.



**4th Place:** (University of Alberta) (Alphabetically) Grant Chapman, Danielle Gabruck, Adam Kilburn, Cameron Klause, Nicole Koskie, Angela Pfeiffer, and President Rod Heitschmidt.



**4th Place Individual:** Nicole Hansen (South Dakota State University) and President Rod Heitschmidt.



**5th Place:** (University of Wyoming) (Alphabetically) Jason Crowder, Joelyn Johnson, Jordana LaFantasie, Judi Mott, Curtis Nixon, Michael Wells, and President Rod Heitschmidt.



**5th Place Individual:** Victor Hugo Resendiz Arvizu (Universidad Antonio Narro) and President Rod Heitschmidt.

## Undergraduate Public Speaking Contest



**1st Place:** Matt Stevenson (Brigham Young University) and President Rod Heitschmidt.



**2nd Place:** Jessica L. Rose (Texas Tech University) and President Rod Heitschmidt.



**3rd Place:** Taina Matheson (Brigham Young University) and President Rod Heitschmidt.



## University Student Display Contest Winners



**1st Place:** (Oregon State University) (Alphabetically) Jaysen Garcia, Travis Miller, Tasha Saporito, Joch Schmucker, Lorraine Thomas, and President Rod Heitschmidt.



**2nd Place:** (Colorado State University) (Alphabetically) Amanda Baker, Haly Barker, Jesse Boyd, Jesse Dillon, Kelly Frisby, Joanne Kelly, Dan Thompson, Jenney Woodward, and President Rod Heitschmidt.



**3rd Place:** (Montana State University) (Alphabetically) Stefani Balison, Dan Bergstrom, Megan Burbee, Kim Jacobs, Nicole Jensen, Josh Keown, Jan Marie Kluver, Elisha Lewis, Ryan Meccage, Jason Morris, Jake Powell, Steph Sever, and President Rod Heitschmidt.

### 2003 Graduate Student Poster Contest Winners

Listed below are the 1<sup>st</sup> and 2<sup>nd</sup> place winners in both PhD and MS levels of the Graduate Student Poster Contest. Please contact Laurie Abbott if you have questions about the winners, authors, titles, awards. (505) 646-2870 [labbott@nmsu.edu](mailto:labbott@nmsu.edu)

#### PhD students

##### First place: (\$200)

Christopher Schauer, Oregon State University,  
Title: The effect of calendar date on in situ NDF and CP degradation characteristics of forage kochia (*Kochia prostrata*).

Authors: Christopher S. Schauer and David W. Bohnert

##### Second place: (\$100)

George W. Powell, University of Alberta  
Title: Effects of aspen understory microclimate on alfalfa growth.

Authors: George W. Powell and Edward W. Bork.

#### MS students

##### First place: (\$200)

Daniel Summers, Brigham Young University  
Title: Vegetation response of a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) community to 6 mechanical treatments in Rich County, Utah.

Authors: Daniel D. Summers, Bruce A. Roundy, Scott C. Walker, and James N. Davis.

##### Second place: (\$100)

Sarah Crocker Heide, University of Idaho  
Title: Comparison of methods to detect conifer encroachment into aspen stands using Landsat ETM+ satellite imagery.

Authors: Sarah Crocker Heide and Stephen C. Bunting

## High Combined Award Winners



**1st Place High Combined NRCS:** *Kimberli Stine, NRCS and Rachel A. Fugal (Brigham Young University).*



**2nd Place High Combined:** *Nicole Hansen (South Dakota State University) and President Rod Heitschmidt.*



**3rd Place High Combined:** *Taina Matheson (Brigham Young University) and President Rod Heitschmidt.*



**4th Place High Combined:** *Grant Chapman (University of Alberta) and President Rod Heitschmidt.*



**5th Place High Combined:** *Jordana LaFantasie (University of Wyoming) and President Rod Heitschmidt.*

## Graduate Student Paper Award Winners

### Ph.D.

- 1st Place: M.M. Patterson, University of Wyoming  
 2nd Place: P.J. Meiman, Colorado State University

### M.S.

- 1st Place: E.C. Dacy, Texas A&M University-Kingsville  
 2nd Place: M. Bourret, Colorado State University

## Letters to the Editor

Dear Editor:

I found the article "Are we 4F or IA" by Thad Box in the February 003 issue of the *Rangelands* to be well done and needed to be said. I have enjoyed Thad's "Listening o the Land" articles but this one is the best. I agree SRM has not stood up for sound basic rangeland management such as drawing on research to determine suitable range, proper numbers or season of use. SRM has been to concerned about the politics of protecting the feelings of its few industry members. We have not been concerned with the condition of the resources of the land and have lost cre-dibility. The artick by James Bartolome, "Viewpoint from 25 Years Ago" is a good example. Did SRM comment on the GAO report? I'll make a bet they did not. The federal agencies like BLM cannot be expected to respond to such reports by important agencies like GAO. Their reactions would have to go through several political filters and so the professionals in the agency must rely on their professional societies like SRM to call such agencies as GAO to task.

Had SRM stood up and protested the federal agencies hiring of non-professionally educated range folks, things might be different today. In this regard I found Rod Heitschmidt's communique in the February 2003 issue of *The Trail Boss News* to be very good and most thoughtful. He made some very good points about our profession. I would like to comment on one important point he made. He wrote the "these changes in public expectation have contributed to 1) the losses in SRM membership 2) the near complete extinction of university traditional departments of Range or their equivalent and 3) the shift of government rangeland management agencies away from hiring traditionally trainet rangeland professionals". Whle the changes at the Universities and agencies are true is not, in my opinion, due to "public expectations". It is in large part due to the fact that SRM never spoke up and loud about the agency change in hiring. A few years back when this all started, I attending a SRM gathering here in DC and talked with the then SRM President and asked him if he was not concerned that he would soon be without a range department and no me would hire his graduates, if he and SRM did at stand up and be counted. Since my retirement, I have continued to follow BLM very closely and I could see it taking place at BLM but he would not listen nor accept that it could ever happen.

He just walked away from me like I was nuts. I wonder what he thinks now? The Administration had launched a deliberate strategy to down grade the need for and hiring specialists like range managers. It is still not too late for SRM and the other resource professional societies to take this subject on and go to work on the new Administration, Agency heads and the Office of Personnel Management. SRM future and its membership and range range management as a profession will continue to decline if we do not speak up.

The other point Rod made that I would like to express my view on is when he said, "All we have to do is focus our attention on rangeland conservation issues rather than rangeland use issues." I believe you cannot separate the two. The use is often the cause of the issue. SRM should concentrate on the rangeland resource., listen to the land as Thad says. and 'not the users and not to "look the other way" on the issues.

I hope Thad and Rod will stay engaged with SRM. Their articles spoke very loudly, were frank, and were right in many respects. I thank them for that.

I am a retired BLMer and an SRM member for nearly fifty years now.

George Lea  
McLean, Virginia

Dear Editor:

Thad Box has been my idol for a long time. Since he started writing a column regularly for *Rangelands*, his position has only solidified! As usual, he makes a great many valid points in his Volume 25, No. 1 25<sup>th</sup> Anniversary) -article. In addition, I greatly enjoyed Barbara East's article in the same issue. If everyone thought about things as she does, we would have significantly fewer controversies than we now face. As far as James W. Bartolome's article is concerned, I have no knowledge of the GAO report he refers to. The pictures included in his article were unclear to me. I trust what he says about them. However, if the GAO wanted pictures of BLM lands that were obviously overgrazed they need only come to me. I can show them instances where both chainings and native vegetation are over-utilized, and salt is regularly placed on water developments/riparian areas.

Jeff Grandison



Dear Editor

I was reading through the lovely 25<sup>th</sup> Anniversary Edition of *Rangelands* when something I saw made me stop and stare in disbelief. It was the advertisement for a book called *Welfare Ranching* on page 41. As I read the synopsis of the book, I couldn't understand why this book was being advertised in our organization's magazine. Either the synopsis is not written well and does not accurately describe what the book is about and the view-points expressed in the book, or it is what it appears to be: a heavily biased, unbalanced diatribe against livestock production on federal lands. This ad would be more appropriate for the magazines of the *Sierra Club* or *World Wildlife Fund* than that of our society which supposedly supports livestock production as a use of rangeland. This book ad gives no indication that there is any discussion of the positive effects of proper livestock management on public lands.

No doubt, there are many acres of land across this country that are being mismanaged both on and off federal land, but it's not all doom and gloom. It's not too late to turn the tide and encourage producers who

use federal land to manage it better. At each meeting, both at the state and international level, that I attend, I hear discussion of what we can do to increase membership. One of the groups declining in membership are livestock producers. Supporting books like this in our official society magazine will not help. There are many better balanced, more even-handed books written on grazing public land. I can't think of any titles off hand, but I do remember seeing some in the recent past. If the idea is to encourage us to find out what the extremists on "the other side of the fence" are thinking, it would have been better to do a book review of the book discussing why it's worth while for our members to read it rather than putting an ad in for it. It's nice to have new advertisers to help support the magazine, but on the face of it, based on what I read in the ad, this was a poor choice.

Other than this ad, this edition of *Rangelands* is well done. Keep up the good work!

Sincerely,

*John Enfield*

## Book Reviews

**Welfare Ranching.** The Subsidized Destruction of the American West. Edited by George Wuerthner and Mollie Matteson. 2002. 346 p. Island/Palace Press, San Rafael, California. US\$45.00 soft-bound. ISBN 1-55963-942.

This peculiar, gigantic volume is a staunch environmentalistic treatise that focuses primarily on the costly and destructive impacts of cattle on rangelands in general, and on contentious justifications for removal of commercial livestock grazing from public lands in particular. Removal of grazing, the editors argue, offers the greatest opportunity remaining for ecological restoration and wildlife protection in this country. This provocative book is intended for any citizen who may be motivated by it to join the effort to "rewild" public lands by ending grazing. It should not be dismissed by professionals in natural resources management.

*Welfare Ranching* is an anthology of 40 essays integrated with 200 color photos and involving 32 authors. It is an unwieldy size of 11 1/2" by 13" and about 5 lb in weight, both of which limit its reading to desk or table and will likely restrict its ultimate sales distribution. Conceived by Douglas Tompkins and published by the Foundation for Deep Ecology which he helped establish, the book is marketed by the Center for Biological Diversity. The contents present a variety of writing styles from sleazy, cynical environmental journalism to perspicacious, scientific reporting. Impressive are 784 endnotes of articles cited in 31 of the essays, these endnotes involving multitudinous publications. Of particular interest are citations from the *Journals of Range Management*, *Wildlife Management*, *Ecology*, and *Soil and Water Conservation*; the periodicals *Ecology*, *Oecologia*, *Conservation Biology*, and *Great Basin Naturalist*; and the texts, *Range Management* by J. Holechek, R. Peiper and C. Herbal, and *Ecological Implications of Livestock Herbivory in the West* ed. by M. Vavra, W. Laycock and R. Pieper.

The essays are organized into seven parts, each part with a theme. Part I explores the magnitude of our western public rangelands and their use by cattle, and nine "ranching myths", each with a retort of "truth".

These dissertations are followed by a thesis identifying five institutional elements of an "iron pentagon", a "nexus of power", which keeps grazing of public lands safe. This part is replete with half-truths and qualified contentions ("most", "some", "many", "often", etc), and the authors are not identified.

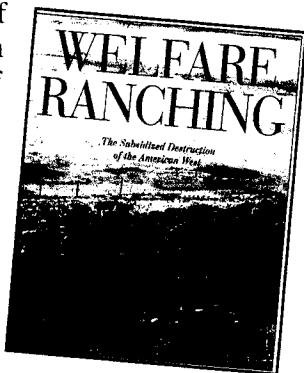
Part II presents an admixture of articles concerning the cultural and historical roots of the western range livestock industry. Particular focus is given the "cowboy", described as a mythical icon of very significant influence on American psyche and our cultural bias in managing western lands for the cow. Except for the cynical portrayal of the cowboy, and one detracting and satirical diatribe by Edward Abbey, Part II is a well-written, comprehensive and factual account of the development and administration of the American West worth

deliberate reading.

Photographs provide the basis for Part III, an overview of the arid West. Following brief instruction to the reader about range management and "how to look and see", the reader is faced with 43 photos which depict comparisons of "livestock-free" and "cow-damaged" rangeland in 12 Western states. Each photo has explanatory and interpretive information concerning site ecology and grazing impacts, all of which appear to be factual and scientifically sound, although somewhat hyperbolized.

Part IV, titled "A Century of Trashing Public Lands" and characterized as the "heart of this book", contains 19 essays, most of which are composed by well-qualified persons of academia or the ecological sciences. Excellent, objective dissertations are given by Mollie Matteson, Allison Jones, Suzanne Founty, Boone Kauffman, and Joy Belsky, et al., which should be read by students of rangeland management. Many of the essays represent state-of-our knowledge of relationships between livestock and certain wildlife, in particular frogs, snails, birds, bears, wolves, prairie dogs, sage grouse, bison and predators.

Part V, consisting of four essays, purportedly deals with ranching economics and subsidies. Certain thought-provoking and, in part, convincing arguments are made in two essays on the diminutive importance of public land grazing and the illegal use of grazing



permits as collateral for loans. However, the others concerning the costs of meat make little contribution to the basic premise of this book.

In Part VI titled, "False Hopes and Counter-Arguments" and written entirely by Editor George Wuerthner, holistic resource management is effectively discredited, and the claims that cattle are a "substitute for buffalo", its "cows or condos", and "livestock as management tools" are contradicted. Much of the latter three articles are a speculative, almost flippant, biased editorial which further condemn livestock and weakens the book's veracity.

*Welfare Ranching* winds down with a brief Part VII, intended to present solutions to end livestock grazing on public lands. Two essays present critical but sincere viewpoints on amending and enforcing regulations applicable to grazing permit administration. The book closes with a postlogue, a "vision" of eliminating livestock grazing on 300 million acres of public lands so that streams flow clear and clean, grunts of bison and howls of wolves, rather than bawling of cows, are heard, and fish, frogs, snails, butterflies and birds are "secure in their homes".

*Welfare Ranching* is a document which magnifies the price our present generations continue to pay for the destructive exploitation and ignorance of the range livestock industry which preceded us. It is an inflammatory condemnation of past and present neglect, malpractice and perfunctory professionalism in rangeland management. The book is openly critical, and oft-times cynical toward ranchers and land managers who have had, and still hold, the responsibility for controlling grazing livestock, and by innuendo, managers who lack a conservation ethic. Cattle are portrayed as a "ubiquitous and pervasive agent of evil which continue unabated to wreak ecological havoc" throughout the Western U.S. Extolled throughout the book are the virtues of ungrazed, pristine rangelands as habitat for a diversity of wildlife, free of the competition, disease transmission, and losses associated with the presence of domestic animals. Grazing of public rangelands, it argues, is monetarily subsidized by the U.S. taxpayers through inordinately low grazing permit fees and costly government programs intended to control livestock predators, provide funds for emergency feed, construct facilities to benefit grazing livestock, restore habitats severely damaged by cattle, and conduct captive breeding to reintroduce wildlife species displaced by overgrazing. Political subsidies are realized through the inordinate influence of western range livestock and land owners or activists on the creation, or defeat, of

federal policies and regulations to an end which benefits their industry.

The text and photos are intended as an exposé of exemplary and despicable mistakes by cattle ranchers and rangeland managers that have led to tragic abuse of water, vegetation and wildlife resources. Although the photographs of ecological damage have unquestionably been selected as worst-case scenarios and locales, they are, nevertheless, an irrefutable record; only the degree and extent of this abuse remains arguable and unknown. The authors apparently expect that heretofore uninformed readers, will, by deduction, regard this ecological damage as a certain and inevitable result of any grazing on all areas of the American West. Not surprisingly, the book gives no recognition to the concept of proper grazing and its benefit to wildlife, nor to the inevitable awareness by the vast majority of rangeland managers of the severe, localized impacts of improperly managed cattle. The body of research in range science and other resource sciences is replete with substantiation of the effects on natural resources of varying degrees and management techniques of grazing. This point is recently and aptly presented in the CAST Issue Paper 22, November, 2002, entitled "*Environmental Impacts of Livestock on U.S. Grazing Lands*." Nor is there any concession in *Welfare Ranching* that livestock production and the maintenance of ecosystem integrity and health can be coincident. Instead, it is stated, "even better managed grazing is destructive ... there is no free lunch".

Carried to its end, the thesis of this book would deny the presence of all livestock on earthen rangelands and cease cultivation of agricultural crops and uses of water devoted to livestock production on the premise that these endeavors are unnecessarily destructive of natural ecosystems. Just as one could verifiably elaborate the destructive effects of excessive, uncontrolled, or imprudent use of fire, tillage, forestry, pharmaceuticals or vehicular transportation, and then argue that their use be discontinued, so this book treats grazing of rangeland. The quest to end public lands grazing is being championed by a coalition of "anti-grazing agitators" whose tenets are enshrined in this book and further editorialized in the article, "Terms of Surrender" of *Range* magazine, Winter, 2003. At its least implication, *Welfare Ranching* is petitioning for a trade-off: the restoration of America's public rangelands by removal of livestock, for the expense of an insignificant number of grazing permittees and cost to the American economy—John V. Stechman, Certified Range Management

Consultant, former rancher, and retired Professor, Cal Poly State University, San Luis Obispo, California.

### **Desert Wings: Controversy in the Idaho Desert.**

By Neils Sparre Nokkentved. 2001. Washington State University Press, Pullman, Washington. 147 p. US\$16.95 paper. ISBN 0-87422-247-8.

"Somebody in the Pentagon picked the region because there was nothing on the map—no roads, no towns. To Air Force leaders, it was like many other public lands in the West—wide-open and perfect for a bombing range. Here, Pentagon officials thought, lived few to object." Little did they know that they were up against a small army that was ready to do battle with the mightiest.

This book is mostly a compilation of Mr. Nokkentved's stories found in the Twin Falls *Times-News* between 1989 and 1999. During that period, the author investigated and reported on the development of a proposed expansion of the United States Air Force training facilities in Owyhee County of southwestern Idaho, an area used by Native Americans as sacred grounds, by ranchers for grazing, and by recreationists for various recreational activities. Even retired Air Force personnel recreated here. The proposed training site, over 1.5 million acres of public lands, was to be used as a bombing range for live bombs and missiles, and for low-level supersonic operations. Amazingly, this proposed expansion came at a time of a huge budget deficits and a lack of any assessment of training needs. The Pentagon had not taken stock of existing facilities, their capacities, or their redundancies. Meanwhile, the Defense Department was attempting to cut the number of bases, but insisted that increased training space was needed for new weapons that would travel faster and see farther.

The author tells it as it was. Throughout his book, in describing this controversy, Mr. Nokkentved identifies information provided by the Air Force that was unclear, conflicting, or false. Some information, he indicates, consisted of "outright lies" which undermined public trust. Initially, the Air Force indicated that this huge new bombing range and the large expanse of supersonic operating airspace was to accommodate some old F-4 Phantom fighters, soon to be retired. The same Air Force later reported that this proposed expansion was not to accommodate these F-4s, but instead was to accommodate a new composite wing. Some time later, the Air Force indicated that F-22s were to be housed at the new expansion. Subsequently

the public was told that the composite wing did not need a new range, but that the F-22s needed greater air space. This chain of events reminds me of a former Prime Minister from my country, Trinidad and Tobago, who said that the media reports truths, half-truths, and innuendos. This statement seems applicable to the Air Force, except that they released mostly half-truths and innuendos.

Psychologists have indicated that people from different countries do share similar emotions such as happiness and sorrow. Politicians vary only by country, but they do what is necessary to get in power and when they do, they often forget their promises and let the "parasitic oligarchy," as described by a former leader of the opposition political party in Trinidad and Tobago, dictate the country's direction. I remember a particular politician saying that he would sleep with the devil if he had to, in order to get into power. The Air Force appeared to be ready to do whatever was necessary to get their facilities in southern Idaho.

This book is well written. The author shows little sign of political affiliation or bias. He revealed the lies of the Air Force. He reported the concerns of various interest groups who were formerly on opposite sides, without taking sides. In addition, most of the information provided in this book is supported by hard evidence. The book focuses on the controversy about the proposed expansion of the Air Force training facilities, the lack of proper justification for such facilities, the blatant lies about the uses of the proposed expansion, and the people of different interests uniting to fight for a common cause. The author was able to add meaningful information to generate more interest in this book. He cites considerable research that revealed information relevant to the controversy.

Significant lessons can be learned from this book. I normally have reservations about media reporters and the stories they tell. The reporting in this book has partly changed my view. In that respect, an important message of the book is that in unity lies strength. Coming together for a common cause has advantages. The Air Force got a thirty-million-dollar range that they did not clearly identify a need for. However, this range would affect only 12,000 acres, not the 1.5 million acres originally proposed. The opposition groups felt that this scaled-back range with its operational restrictions would protect wildlife, recreational opportunities, Indian sacred lands and grazing grounds.

Total success in preventing a bombing range from being established may not have been achieved, but success of any size is significant. Success is some-



times only that we have said our piece and somebody, even though reluctantly, has listened. The people of Idaho showed that the size of the army is insignificant; it is the battle fought that matters.—*Neemedass Chandool*, Ph.D. student, Washington State University, Pullman, Washington.

**Insects Revealed: Monsters or Marvels.** By Jacques de Tonnancour. 2002. Cornell University Press, Ithaca, New York. 159 p. US\$28.00 hardbound. ISBN 0-8014-4023-8.

As a boy, I had an inquisitive fascination with insects. Everything about insects was new and interesting to me, and I learned a great deal about these creatures at an early age. One tool that would have helped me learn is the book *Insects Revealed: Monsters or Marvels*, which is a popularized introduction to insects for people of all ages. The author of the book, Jacques de Tonnancour, does an excellent job of revealing many characteristics of insects, while keeping the language simple enough to hold the interest of someone new to this subject.

In Chapter 1, the author uses many humorous nicknames for insects in an effort to break the ice for new readers, and point out that insects serve many purposes in the world. Throughout the book, humorous stories are told of some misconceptions the author has encountered concerning insects. A few of these misconceptions I had heard before, and was please to see them dispelled.

In Chapter 2, the author begins by stating that “the objective of this book is to reveal the beauty of insects to those that are receptive to it.” He tackles this challenge in two ways. The first way he reveals the beauty is through photography. The book’s high quality color photos are detailed. The attractive photography allows the reader greater appreciation of the subject. In fact, *Insects Revealed* is worth a look for the photographs alone. The second way the author reveals beauty is in the language of the book. The language describes insects in a way that makes the reader curious. It is also simple enough to hold the reader’s attention.

In Chapter 3, the author eases the reader into the

classification of insects. He author keeps the classification and naming short, to avoid boring the novice reader. Classification is necessary though, because it prepares the reader for the chapters to come. *Insects Revealed* has excellent descriptions of important contributors to the field of entomology, and these descriptions add depth to the book. When describing insect morphology, the author uses many examples to make complex or tedious details more interesting. These examples simplify complex subjects and aid in the ease of understanding his book.

Subsequent chapters describe insect origins and evolutions, insect morphology, coloration, and defense mechanisms. Insects’ roles in the environment and insect-plant relationships also each have chapters devoted to them. While providing the reader with enough content for the book to be informative, the author keeps the technical terms to a minimum.

From Chapter 4 through the closing Chapter 14, the book has a logical flow from topic to topic. The information provided in these chapters has enough content for someone who already knows something about insects, yet the information is not too complex for a

younger reader either. It’s suitability for a range of ages makes this book handy to have on the shelf.

*Insects Revealed* uses simplified language and beautiful photography to paint a picture for the reader. When describing aspects of insects, *Insects Revealed* proves

that technical terms are un-

necessary to make a good book. I could have used this book years ago when I was chasing insects across fields, and reading any books on insects that I could find. Both younger and older readers should appreciate its attractive photography and readable text. —*Joe Gosser*, Washington State University, Pullman, Washington.



# Membership Application

*Last Updated 2/14/2003*

**Society for Range Management**  
**445 Union Blvd., Suite 230**  
**Lakewood, CO 80228-1259**  
**Phone: 303-986-3309**  
**Fax: 303-986-3892**  
**Email: [lrادتke@rangelands.org](mailto:lrادتke@rangelands.org)**



\* (Please Print or Type) First Name \_\_\_\_\_ MI \_\_\_\_\_ \*Last Name \_\_\_\_\_  
 Nickname (Informal) \_\_\_\_\_ Certifications: ☐ CRMC ☐ CPRM ☐ Other \_\_\_\_\_  
 Title \_\_\_\_\_ \* ☐ Male \* ☐ Female

\* Company/Organization/Business Affiliation/ (Students put College or University) \_\_\_\_\_

* Business Street Address _____ or _____	* Home Street Address _____
Suite/Apt# _____	Suite/Apt# _____
City _____ State/Province _____	City _____ State/Province _____
Zip/Postal Code _____ Country _____	Zip/Postal Code _____ Country _____
* Business Phone (Include Area Code) _____ or _____	* Home Phone (Include Area Code) _____
Business Fax (Include Area Code) _____	Home Fax (Include Area Code) _____
*Email Address _____	*Email Address _____
Please mail my publications to my: <input type="checkbox"/> Business <input type="checkbox"/> Home	Have you ever been a member of SRM? <input type="checkbox"/> Yes <input type="checkbox"/> No
Please send the <b>Trail Boss News</b> electronically <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, when _____
How did you hear about SRM? _____	Name of member that recruited you _____

## MEMBERSHIP CLASSIFICATION (See reverse for Dues Schedule)

☐ Regular ☐ Apprentice ☐ Student ☐ Associate ☐ Life  
☐ Life Family ☐ Family ☐ Institutional ☐ Commercial

**Student Information** (Applicants for Student Membership: please complete the following information and provide proof of current FULL TIME registration for student status) For questions on status contact Lesley at [lrادتke@rangelands.org](mailto:lrادتke@rangelands.org) or 303-986-3309

High School: ☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior  
 College: ☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior  
 Graduate: ☐ Year 1 ☐ Year 2 ☐ Year 3 ☐ Year 4 ☐ Year 5 ☐ Year 6

## SECTION AFFILIATION (See reverse for Sections)

SRM members must choose a Section affiliation. Section affiliation is determined by geographical region, but members may be affiliated with any and as many Sections as desired upon payment of additional Section dues. If you wish to belong to more than one Section, please contact the SRM office at (303) 986-3309 for additional dues amount.

\*Primary Section Affiliation \_\_\_\_\_ Add'l Sections \_\_\_\_\_

\* = Required Fields ☐ Please check box if you do not want your contact information printed in the SRM Member Directory

## OPTIONAL SUBSCRIPTIONS

Members receive six issues of *Rangelands* and 12 issues of *The Trail Boss News* with their paid membership. Members may opt to receive 6 issues of the *Journal of Range Management* for \$15.00 per year.

I would like to receive the *Journal of Range Management*

☐ Yes

☐ No

## PAYMENT OPTIONS

Payment must be made in U.S. funds drawn on a U.S. bank. Please make checks/money orders payable to: **Society For Range Management**

Dues \$ \_\_\_\_\_

Optional Subscriptions \$ \_\_\_\_\_

TOTAL AMOUNT ENCLOSED \$ \_\_\_\_\_

Credit Card Payment:

☐

Visa

☐

Mastercard

☐

American Express

☐

Discover

☐

Diners Club

Name as it appears on credit card

Card Number

Expiration Date

Signature (REQUIRED)

## MEMBERSHIP CLASSIFICATION

**Regular**—Basic individual membership, includes *Rangelands* and the *Trail Boss News*, voting privileges, committee service, and nomination & election to any office.

**Family**—Individuals of same household desiring more than one Regular membership. Families receive only one set of publications, but each member retains all rights & privileges of Regular member.

**Apprentice**—Verified students who have ended course of study. Can maintain this classification for a period of five (5) years, but must succeed to a different class of membership in the sixth calendar year. Not eligible to hold office.

**Student**—Full-time students (high school through graduate school). Not eligible to hold office. Must succeed to different class of membership in the calendar year following termination of course of study.

**Associate**—For individuals in other fields who wish to avail themselves of opportunities for rangeland interactions. Not eligible to hold office. Receives *Trail Boss News* only.

**Life**—Same as Regular with one-time dues payment.

**Life Family**—Individuals of same family desiring more than one Life membership.

**Institutional**—Institutions or other entities not organized for profit (i.e., Federal agencies, livestock organizations, Indian tribes, universities). Membership is in institutions name with a designated representative. Not eligible to hold office. Listed in Society publications.

**Commercial**—Businesses, proprietorships, individuals or other entities organized for profit. Must designate a representative. Listed in Society publications.

## SECTIONS

Arizona, California-Pacific (California, Hawaii, and all the lands in the Pacific not currently associated with the following: Mexico and Pacific Northwest Sections of SRM, the state of Alaska, Australia), Colorado, Florida, Idaho, International Mountain (Alberta, Western Montana), Kansas, Mexico, Nat'l Capital (Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, West Virginia), Nebraska, Nevada, New Mexico, North Central (Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, Ontario, Quebec, Wisconsin), Northern Great Plains (Eastern Montana, Manitoba, North Dakota, Saskatchewan), Oklahoma, Pacific Northwest (British Columbia, Oregon, Washington), South Dakota, Southern (Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, Tennessee), Texas, Utah, Wyoming, Unsectioned (Alaska, Hawaii, Puerto Rico, Foreign)

## SCHEDULE OF DUES (As of 1/1/2003)

**Regular—\$75** (all Sections except Mexico/Unsectioned)  
\$70 (Mexico/Unsectioned)

**Associate—\$25**

**Life—\$1,500** (Call SRM office for installment plan option)

**Life Family—\$1,750** (Call SRM office for installment plan option)

**Commercial: \$500**

**Other** (Dues vary by Section):

Section	Apprentice	Student	Family (ea. add'l)	Institutional
Arizona	\$36	\$24	\$27	\$205
California-Pacific, Kansas, Oklahoma, South Dakota	\$37	\$25	\$27	\$205
Colorado	\$36	\$24	\$24	\$205
Florida, Int'l Mountain, Nevada, N. Great Plains, Pacific NW, Southern, Utah	\$39	\$27	\$27	\$205
Idaho, North Central	\$36	\$24	\$25	\$205
Mexico, Unsectioned	\$34	\$22	\$22	\$200
National Capital, Wyoming	\$36	\$24	\$25	\$203
Nebraska	\$36	\$24	\$26	\$204
New Mexico	\$35	\$23	\$24	\$202
Texas	\$38	\$26	\$27	\$205



United States  
Department of  
Agriculture

Forest  
Service

Washington Office

14<sup>th</sup> & Independence SW  
P.O. Box 96090  
Washington, DC 20090-6090

File Code: 1500/2200

Date: February 26, 2003

Samuel W. Albrecht  
Executive Vice President  
Society for Range Management  
445 Union Street  
Suite 230  
Lakewood, CO 80228

Dear Sam:

Congratulations to the Society for Range Management for 25 years of publishing *Rangelands*.

As announced by Sally Collins February 2, 2003, at your annual meeting in Casper, Wyoming, the Forest Service accepts your invitation to sponsor upcoming *Rangelands*. We are excited about partnering with the Society in celebrating this professional publication. We believe that by doing so we can extend our close working relationship built over the past 56 years of SRM's existence.

*Rangelands* has been key in communicating important information on rangeland issues. We welcome this opportunity to continue to work closely with the Society for Range Management to bring scientific, technical and practical information to rangeland managers.

Again, congratulations!

Sincerely,

DALE N. BOSWORTH  
Chief





